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Rexroth ECODRIVE Cs Drive Controllers MGP 01VRS

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Edition 01

Troubleshooting Guide

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Purpose of Documentation This document is designed to assist maintenance personnel in identifying errors with the machinery.

- help in understanding error messages
- help in finding the causes of errors
- describe the procedure for trouble shooting
- simplify the process of establishing contact with the Rexroth Customer service department

Record of Revisions

Description	Release Date	Notes
DOK-ECODR3-MGP-01VRS**-WA01-EN-P	02.2003	First Release

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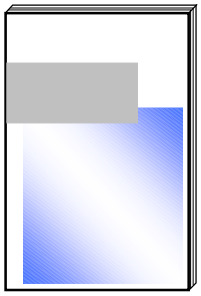
Summary of Documentation - Overview



Functional Description:

Description of all implemented Function based on SERCOS-Parameters

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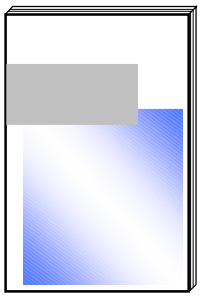

Parameter Description:

A description of all parameters used in the firmware

Order designation:
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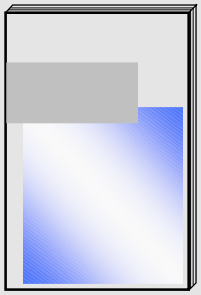

Troubleshooting Guide:

-Explanation of the diagnostic states
-How to proceed when eliminating faults

Order designation:
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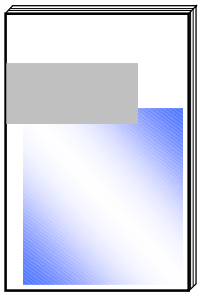

Firmware Version Notes:

Description of new and changed functions in terms of the derivatives:
FWA-ECODR3-MGP-01VRS-MS

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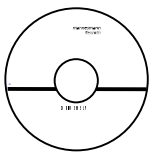

CD: DRIVEHELP

Collection of Windows help systems which contains documentation on firmware types

Order designation:
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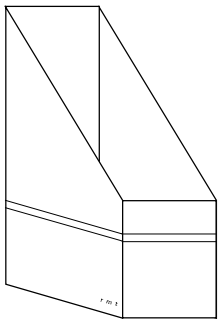

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1 Diagnostic Message Descriptions

Overview of the Diagnostic Message Descriptions

Diagnostic Message Types

Each operational state of the drive will be characterized with a diagnostic message.

Differentiations will be made between:

- **Error diagnostic messages**
- **Warning diagnostic messages**
- **Command diagnostic messages**
- **Drive mode diagnostic messages**
- **Operation status**

Construction of a Diagnostic Message

A diagnostic message consists of:

- **Diagnostic message number**
- **Diagnostic text**

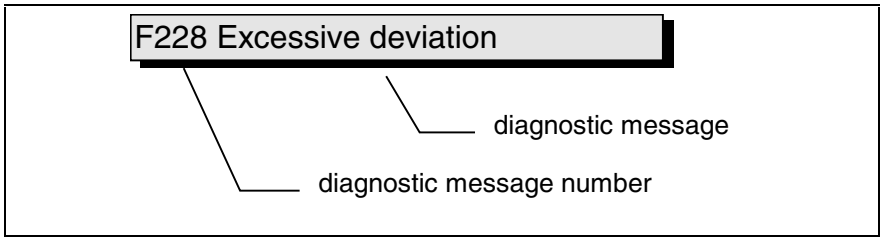

Fig. 1-1: Diagnostic message with a diagnostic message number and text

For the example in the graphic, "F2" and "28" are shown alternately on the H1-Display.
The control system can read out the diagnostic number in hexadecimal form in parameter **S-0-0390, Diagnostic message number**.
In addition, the drive provides to the control system the diagnostic number and diagnostic text as a string **F228 Excessive deviation** in parameter **S-0-0095, Diagnostic message**.

H1-Display

The H1-Display serves as an optical display of the diagnostic message on the drive.

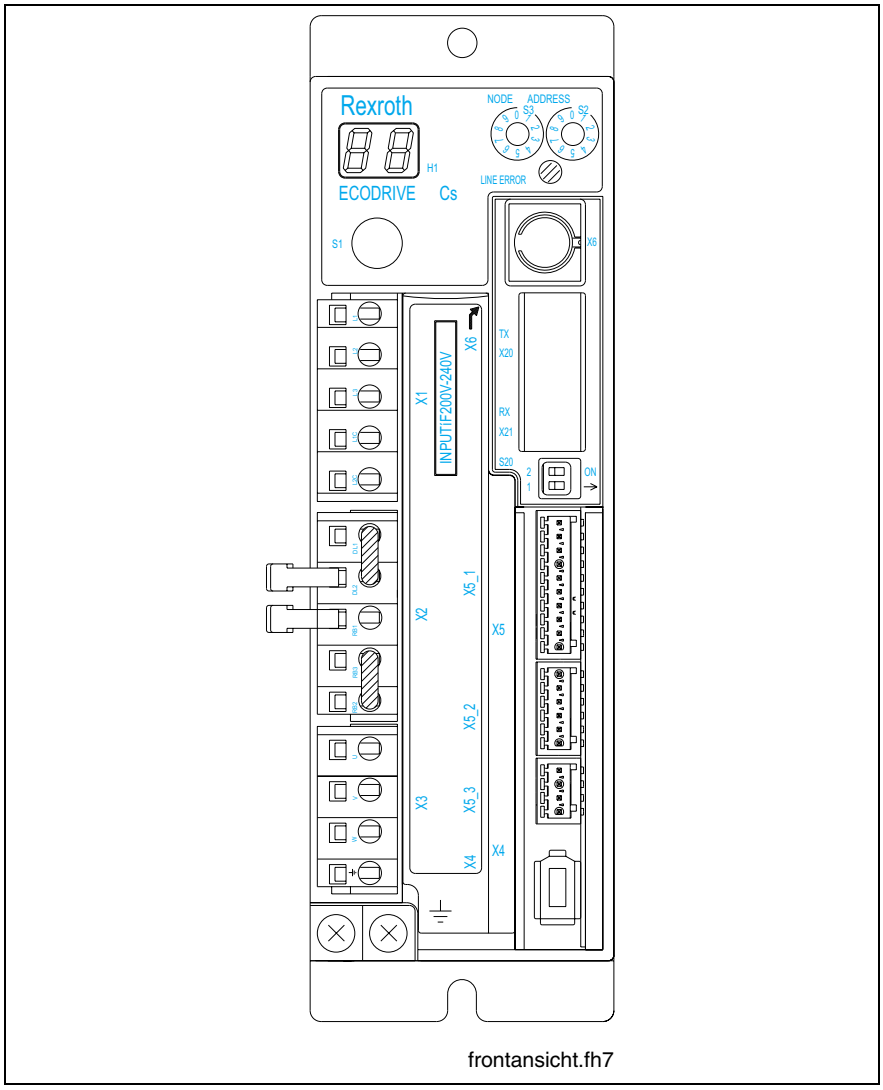

Fig. 1-2: H1-Display

The diagnostic number appears on this two-positional seven-segment display. The image can be seen on the figure "Priority-dependent diagnostic message display" (Fig. 1-3).
This display quickly shows the current operation status without the use of a communications interface.
The operating mode cannot be seen from the H1-Display. If the drive follows the operating mode and no command was activated, then the symbol "AF" appears on the display.

Diagnostic Message Output Priority

If more than one diagnostic message is waiting, then the message with the highest priority will be displayed.
The following graphic classifies operation status in order of importance.

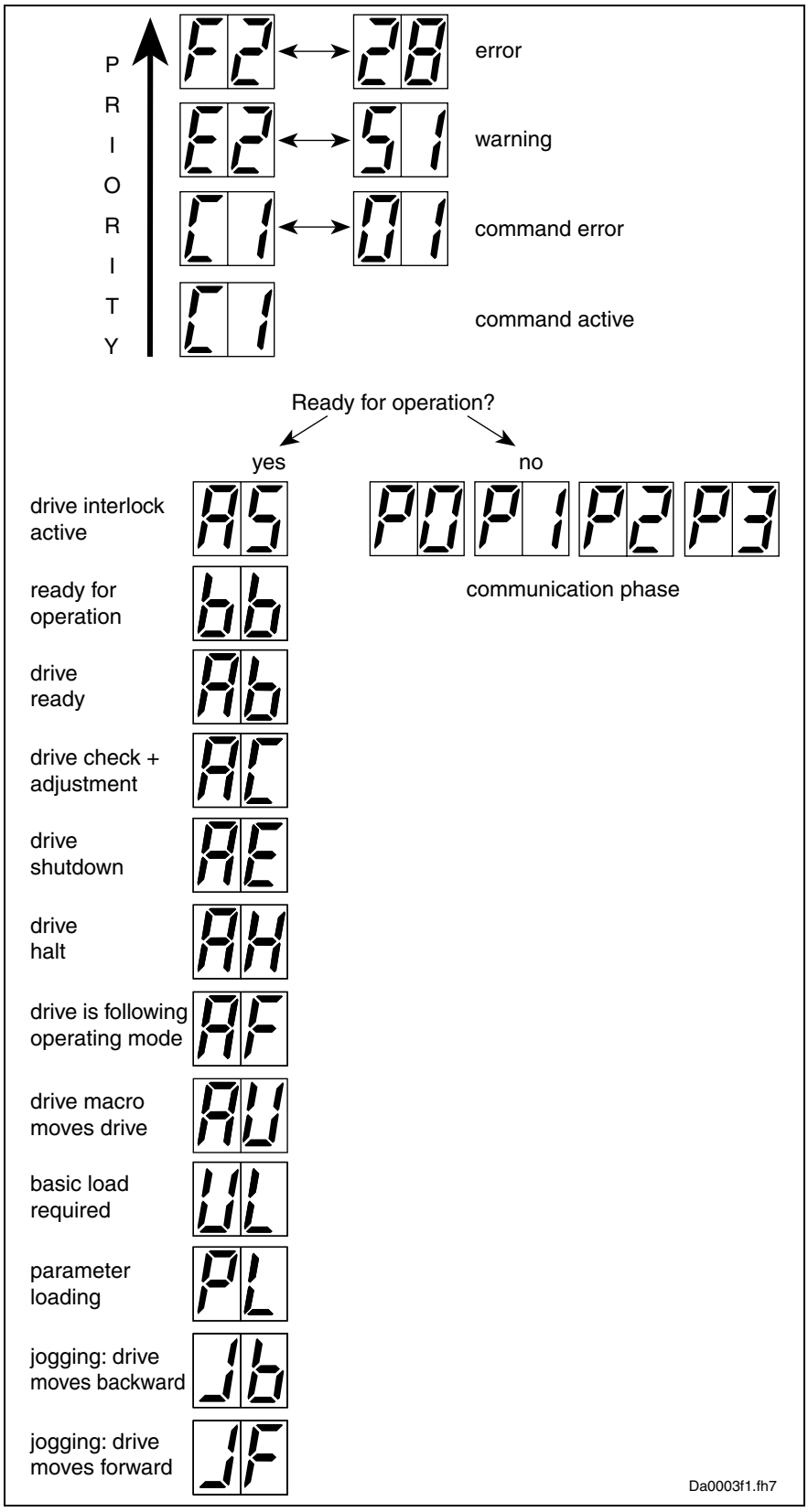

Fig. 1-3: Priority-dependent diagnostic message display

Clear Coded Diagnostic Message

The clear coded diagnostic message contains the diagnostic message number followed by the diagnostic text, as shown in the example "Excessive deviation" (Fig. 1-1).
It can be read out with parameter **S-0-0095, Diagnostic message** and directly displays the operation status on an operator surface.
The clear coded diagnostic message will be switched to the current language.

2 Important Directions for Use

2.1 Appropriate Use

Introduction

Rexroth Indramat products represent state-of-the-art developments and manufacturing. They are tested prior to delivery to ensure operating safety and reliability.
The products may only be used in the manner that is defined as appropriate. If they are used in an inappropriate manner, then situations can develop that may lead to property damage or injury to personnel.

Note: Rexroth Indramat, as manufacturer, is not liable for any damages resulting from inappropriate use. In such cases, the guarantee and the right to payment of damages resulting from inappropriate use are forfeited. The user alone carries all responsibility of the risks.

Before using Rexroth Indramat products, make sure that all the pre-requisites for an appropriate use of the products are satisfied:

- Personnel that in any way, shape or form uses our products must first read and understand the relevant safety instructions and be familiar with appropriate use.
- If the product takes the form of hardware, then they must remain in their original state, in other words, no structural changes are permitted. It is not permitted to decompile software products or alter source codes.
- Do not mount damaged or faulty products or use them in operation.
- Make sure that the products have been installed in the manner described in the relevant documentation.

- Areas of Use and Application

Drive controllers made by Rexroth Indramat are designed to control electrical motors and monitor their operation.
Control and monitoring of the motors may require additional sensors and actors.

Note: The drive controllers may only be used with the accessories and parts specified in this document. If a component has not been specifically named, then it may not be either mounted or connected. The same applies to cables and lines.
Operation is only permitted in the specified configurations and combinations of components using the software and firmware as specified in the relevant function descriptions.

Every drive controller has to be programmed before starting it up, making it possible for the motor to execute the specific functions of an application.
The drive controllers of the ECODRIVE03 family are designed for use in single or multiple-axis drive and control applications.
To ensure an application-specific use, the drive controllers are available with differing drive power and different interfaces.
Typical applications of drive controllers belonging to the ECODRIVE03 family are:

- handling and mounting systems,
- packaging and foodstuff machines,
- printing and paper processing machines and
- machine tools.

The drive controllers may only be operated under the assembly, installation and ambient conditions as described here (temperature, system of protection, humidity, EMC requirements, etc.) and in the position specified.

Inappropriate Use

Using the drive controllers outside of the above-referenced areas of application or under operating conditions other than described in the document and the technical data specified is defined as “inappropriate use".
Drive controllers may not be used if

- they are subject to operating conditions that do not meet the above specified ambient conditions. This includes, for example, operation under water, in the case of extreme temperature fluctuations or extremely high maximum temperatures or if
- Rexroth Indramat has not specifically released them for that intended purpose. Please note the specifications outlined in the general safety instructions!

3 Safety Instructions for Electric Drives and Controls

3.1 Introduction

Read these instructions before the initial startup of the equipment in order to eliminate the risk of bodily harm or material damage. Follow these safety instructions at all times.
Do not attempt to install or start up this equipment without first reading all documentation provided with the product. Read and understand these safety instructions and all user documentation of the equipment prior to working with the equipment at any time. If you do not have the user documentation for your equipment, contact your local Rexroth Indramat representative to send this documentation immediately to the person or persons responsible for the safe operation of this equipment.
If the equipment is resold, rented or transferred or passed on to others, then these safety instructions must be delivered with the equipment.

Improper use of this equipment, failure to follow the safety instructions in this document or tampering with the product, including disabling of safety devices, may result in material damage, bodily harm, electric shock or even death!

3.2 Explanations

The safety instructions describe the following degrees of hazard seriousness in compliance with ANSI Z535. The degree of hazard seriousness informs about the consequences resulting from non-compliance with the safety instructions.

Warning symbol with signal word	Degree of hazard seriousness according to ANSI
DANGER	Death or severe bodily harm will occur.
WARNING	Death or severe bodily harm may occur.
CAUTION	Bodily harm or material damage may occur.

Fig. 3-1: Hazard classification (according to ANSI Z535)

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3.3 Hazards by Improper Use

DANGER

High voltage and high discharge current! Danger to life or severe bodily harm by electric shock!

DANGER

Dangerous movements! Danger to life, severe bodily harm or material damage by unintentional motor movements!

WARNING

High electrical voltage due to wrong connections! Danger to life or bodily harm by electric shock!

WARNING

Health hazard for persons with heart pacemakers, metal implants and hearing aids in proximity to electrical equipment!

CAUTION

Surface of machine housing could be extremely hot! Danger of injury! Danger of burns!

CAUTION

Risk of injury due to improper handling! Bodily harm caused by crushing, shearing, cutting and mechanical shock or incorrect handling of pressurized systems!

CAUTION

Risk of injury due to incorrect handling of batteries!

3.4 General Information

Rexroth Indramat GmbH is not liable for damages resulting from failure to observe the warnings provided in this documentation.

Read the operating, maintenance and safety instructions in your language before starting up the machine. If you find that you cannot completely understand the documentation for your product, please ask your supplier to clarify.

Proper and correct transport, storage, assembly and installation as well as care in operation and maintenance are prerequisites for optimal and safe operation of this equipment.

Only persons who are trained and qualified for the use and operation of the equipment may work on this equipment or within its proximity.

The persons are qualified if they have sufficient knowledge of the assembly, installation and operation of the equipment as well as an understanding of all warnings and precautionary measures noted in these instructions.

Furthermore, they must be trained, instructed and qualified to switch electrical circuits and equipment on and off in accordance with technical safety regulations, to ground them and to mark them according to the requirements of safe work practices. They must have adequate safety equipment and be trained in first aid.

Only use spare parts and accessories approved by the manufacturer.

Follow all safety regulations and requirements for the specific application as practiced in the country of use.

The equipment is designed for installation in industrial machinery.

The ambient conditions given in the product documentation must be observed.

Use only safety features and applications that are clearly and explicitly approved in the Project Planning Manual.

For example, the following areas of use are not permitted: construction cranes, elevators used for people or freight, devices and vehicles to transport people, medical applications, refinery plants, transport of hazardous goods, nuclear applications, applications sensitive to high frequency, mining, food processing, control of protection equipment (also in a machine).

The information given in the documentation of the product with regard to the use of the delivered components contains only examples of applications and suggestions.

The machine and installation manufacturer must

make sure that the delivered components are suited for his individual application and check the information given in this documentation with regard to the use of the components,

make sure that his application complies with the applicable safety regulations and standards and carry out the required measures, modifications and complements.

Startup of the delivered components is only permitted once it is sure that the machine or installation in which they are installed complies with the national regulations, safety specifications and standards of the application.

Operation is only permitted if the national EMC regulations for the application are met.
The instructions for installation in accordance with EMC requirements can be found in the documentation "EMC in Drive and Control Systems".
The machine or installation manufacturer is responsible for compliance with the limiting values as prescribed in the national regulations.

Technical data, connections and operational conditions are specified in the product documentation and must be followed at all times.

3.5 Protection Against Contact with Electrical Parts

Note: This section refers to equipment and drive components with voltages above 50 Volts.

Touching live parts with voltages of 50 Volts and more with bare hands or conductive tools or touching ungrounded housings can be dangerous and cause electric shock. In order to operate electrical equipment, certain parts must unavoidably have dangerous voltages applied to them.

High electrical voltage! Danger to life, severe bodily harm by electric shock!

Only those trained and qualified to work with or on electrical equipment are permitted to operate, maintain or repair this equipment.

Follow general construction and safety regulations when working on high voltage installations.

Before switching on power the ground wire must be permanently connected to all electrical units according to the connection diagram.

Do not operate electrical equipment at any time, even for brief measurements or tests, if the ground wire is not permanently connected to the points of the components provided for this purpose.

Before working with electrical parts with voltage higher than 50 V, the equipment must be disconnected from the mains voltage or power supply. Make sure the equipment cannot be switched on again unintended.

The following should be observed with electrical drive and filter components:

Wait five (5) minutes after switching off power to allow capacitors to discharge before beginning to work. Measure the voltage on the capacitors before beginning to work to make sure that the equipment is safe to touch.

Never touch the electrical connection points of a component while power is turned on.

Install the covers and guards provided with the equipment properly before switching the equipment on. Prevent contact with live parts at any time.

A residual-current-operated protective device (RCD) must not be used on electric drives! Indirect contact must be prevented by other means, for example, by an overcurrent protective device.

Electrical components with exposed live parts and uncovered high voltage terminals must be installed in a protective housing, for example, in a control cabinet.

To be observed with electrical drive and filter components:

DANGER

High electrical voltage on the housing!
High leakage current! Danger to life, danger of injury by electric shock!

Connect the electrical equipment, the housings of all electrical units and motors permanently with the safety conductor at the ground points before power is switched on. Look at the connection diagram. This is even necessary for brief tests.

Connect the safety conductor of the electrical equipment always permanently and firmly to the supply mains. Leakage current exceeds 3.5 mA in normal operation.

Use a copper conductor with at least 10 mm² cross section over its entire course for this safety conductor connection!

Prior to startups, even for brief tests, always connect the protective conductor or connect with ground wire. Otherwise, high voltages can occur on the housing that lead to electric shock.

3.6 Protection Against Electric Shock by Protective Low Voltage (PELV)

All connections and terminals with voltages between 0 and 50 Volts on Rexroth Indramat products are protective low voltages designed in accordance with international standards on electrical safety.

WARNING

High electrical voltage due to wrong connections! Danger to life, bodily harm by electric shock!

Only connect equipment, electrical components and cables of the protective low voltage type (PELV = Protective Extra Low Voltage) to all terminals and clamps with voltages of 0 to 50 Volts.

Only electrical circuits may be connected which are safely isolated against high voltage circuits. Safe isolation is achieved, for example, with an isolating transformer, an opto-electronic coupler or when battery-operated.

3.7 Protection Against Dangerous Movements

Dangerous movements can be caused by faulty control of the connected motors. Some common examples are:
improper or wrong wiring of cable connections
incorrect operation of the equipment components
wrong input of parameters before operation
malfunction of sensors, encoders and monitoring devices
defective components
software or firmware errors
Dangerous movements can occur immediately after equipment is switched on or even after an unspecified time of trouble-free operation.
The monitoring in the drive components will normally be sufficient to avoid faulty operation in the connected drives. Regarding personal safety, especially the danger of bodily injury and material damage, this alone cannot be relied upon to ensure complete safety. Until the integrated monitoring functions become effective, it must be assumed in any case that faulty drive movements will occur. The extent of faulty drive movements depends upon the type of control and the state of operation.

Dangerous movements! Danger to life, risk of injury, severe bodily harm or material damage!

Ensure personal safety by means of qualified and tested higher-level monitoring devices or measures integrated in the installation. Unintended machine motion is possible if monitoring devices are disabled, bypassed or not activated.

Pay attention to unintended machine motion or other malfunction in any mode of operation.

Keep free and clear of the machine's range of motion and moving parts. Possible measures to prevent people from accidentally entering the machine's range of motion:

- use safety fences
- use safety guards
- use protective coverings
- install light curtains or light barriers

Fences and coverings must be strong enough to resist maximum possible momentum, especially if there is a possibility of loose parts flying off.

Mount the emergency stop switch in the immediate reach of the operator. Verify that the emergency stop works before startup. Don't operate the machine if the emergency stop is not working.

Isolate the drive power connection by means of an emergency stop circuit or use a starting lockout to prevent unintentional start.

Make sure that the drives are brought to a safe standstill before accessing or entering the danger zone. Safe standstill can be achieved by switching off the power supply contactor or by safe mechanical locking of moving parts.

Secure vertical axes against falling or dropping after switching off the motor power by, for example:

- mechanically securing the vertical axes
- adding an external braking/ arrester/ clamping mechanism
- ensuring sufficient equilibration of the vertical axes

The standard equipment motor brake or an external brake controlled directly by the drive controller are not sufficient to guarantee personal safety!

Disconnect electrical power to the equipment using a master switch and secure the switch against reconnection for:

- maintenance and repair work
- cleaning of equipment
- long periods of discontinued equipment use

Prevent the operation of high-frequency, remote control and radio equipment near electronics circuits and supply leads. If the use of such equipment cannot be avoided, verify the system and the installation for possible malfunctions in all possible positions of normal use before initial startup. If necessary, perform a special electromagnetic compatibility (EMC) test on the installation.

3.8 Protection Against Magnetic and Electromagnetic Fields During Operation and Mounting

Magnetic and electromagnetic fields generated near current-carrying conductors and permanent magnets in motors represent a serious health hazard to persons with heart pacemakers, metal implants and hearing aids.

WARNING

Health hazard for persons with heart pacemakers, metal implants and hearing aids in proximity to electrical equipment!

Persons with heart pacemakers, hearing aids and metal implants are not permitted to enter the following areas:

- Areas in which electrical equipment and parts are mounted, being operated or started up.
- Areas in which parts of motors with permanent magnets are being stored, operated, repaired or mounted.

If it is necessary for a person with a heart pacemaker to enter such an area, then a doctor must be consulted prior to doing so. Heart pacemakers that are already implanted or will be implanted in the future, have a considerable variation in their electrical noise immunity. Therefore there are no rules with general validity.

Persons with hearing aids, metal implants or metal pieces must consult a doctor before they enter the areas described above. Otherwise, health hazards will occur.

3.9 Protection Against Contact with Hot Parts

CAUTION

Housing surfaces could be extremely hot! Danger of injury! Danger of burns!

Do not touch housing surfaces near sources of heat! Danger of burns!

After switching the equipment off, wait at least ten (10) minutes to allow it to cool down before touching it.

Do not touch hot parts of the equipment, such as housings with integrated heat sinks and resistors. Danger of burns!

3.10 Protection During Handling and Mounting

Under certain conditions, incorrect handling and mounting of parts and components may cause injuries.

Risk of injury by incorrect handling! Bodily harm caused by crushing, shearing, cutting and mechanical shock!

Observe general installation and safety instructions with regard to handling and mounting.

Use appropriate mounting and transport equipment.

Take precautions to avoid pinching and crushing.

Use only appropriate tools. If specified by the product documentation, special tools must be used.

Use lifting devices and tools correctly and safely.

For safe protection wear appropriate protective clothing, e.g. safety glasses, safety shoes and safety gloves.

Never stand under suspended loads.

Clean up liquids from the floor immediately to prevent slipping.

3.11 Battery Safety

Batteries contain reactive chemicals in a solid housing. Inappropriate handling may result in injuries or material damage.

Risk of injury by incorrect handling!

Do not attempt to reactivate discharged batteries by heating or other methods (danger of explosion and cauterization).

Never charge non-chargeable batteries (danger of leakage and explosion).

Never throw batteries into a fire.

Do not dismantle batteries.

Do not damage electrical components installed in the equipment.

Note: Be aware of environmental protection and disposal! The batteries contained in the product should be considered as hazardous material for land, air and sea transport in the sense of the legal requirements (danger of explosion). Dispose batteries separately from other waste. Observe the legal requirements in the country of installation.

3.12 Protection Against Pressurized Systems

Certain motors and drive controllers, corresponding to the information in the respective Project Planning Manual, must be provided with pressurized media, such as compressed air, hydraulic oil, cooling fluid and cooling lubricant supplied by external systems. Incorrect handling of the supply and connections of pressurized systems can lead to injuries or accidents. In these cases, improper handling of external supply systems, supply lines or connections can cause injuries or material damage.

CAUTION

Danger of injury by incorrect handling of pressurized systems !

Do not attempt to disassemble, to open or to cut a pressurized system (danger of explosion).

Observe the operation instructions of the respective manufacturer.

Before disassembling pressurized systems, release pressure and drain off the fluid or gas.

Use suitable protective clothing (for example safety glasses, safety shoes and safety gloves)

Remove any fluid that has leaked out onto the floor immediately.

Note: Environmental protection and disposal! The media used in the operation of the pressurized system equipment may not be environmentally compatible. Media that are damaging the environment must be disposed separately from normal waste. Observe the legal requirements in the country of installation.

Notes

4 Description of Diagnostic Messages F… and E…

4.1 Error Diagnostic Messages F…

Many functions are monitored subject to operating modes and parameter settings. An error message is generated if a condition is discovered which no longer allows proper operation.

Error Classes

The errors are separated into four different error classes. The error class is evident from the diagnostic message. They are determined with the drive's error response.

Error class	Diagnostic message	Drive reaction
Fatal	F8xx	Torque free switching
Travel range	F6xx	Speed command value-zero switch
Interface	F4xx	In accordance with "Best possible deceleration"
Non-fatal	F2xx	In accordance with "Best possible deceleration"

Fig. 4-1: Error classes and drive reaction

Drive's Error Reaction

If an error state is detected in the drive then an automatic operation of the drive's error response will be started as long the drive is in control. The H1-Display blinks a Fx / xx.

The drive's reaction can be parameterized by **P-0-0119, Best possible deceleration** with interface and non-fatal errors. At the end of each error reaction the drive is switched off.

Reset the Error

Errors will not be automatically deleted but must be:

- Reset from the control through the initialization of the command **S-0-0099, Reset class 1 diagnostic** or
- reset by pressing the **"S1"** button.

If the error state is still present then the error will be immediately detected again.

A positive edge bit on the control enable signal is necessary in order to turn on the drive again.

F205 Cam shaft invalid

Cause:

If one of the two cam shafts becomes invalid, e.g. error when loading, the acknowledgeable error **F205** is generated when switching to phase 4.

If you change to an invalid cam shaft during operation, the drive is shut down and the error **F205** is generated, too.

Remedy:

Acknowledge the error with the "S1" button and reload the faulty cam shaft.

Switching to uninitialized operation mode

Cause:

0 has been selected in at least one of the four mode operating mode parameters **S-0-0032…35**. This mode has been selected by the bits 8 and 9 in the master control word while the drive controller was on.

Remedy:

Enter the desired mode in the activated mode parameter.

Which operation modes can be selected in a certain device is written in the description for the operation mode parameters:

Parameter:	Primary mode of operation	S-0-0032
	Secondary operation mode 1	S-0-0033
	Secondary operation mode 2	S-0-0034
	Secondary operation mode 3	S-0-0035

See also the functional description: "Setting the Operating Mode Parameters"

F208 UL The motor type has changed.

This indication happens when you power up for the first time with a new motor. The regulator settings for the current, velocity and position loops are stored in the feedback on the motor. After powering up, the drive compares the motor type stored in the parameter with the connected motor type. If the motor types do not match, basic control loop settings must be adapted, too.

With the Basic Load command, the default control loop settings are loaded from the feedback memory into the drive. The previous loop settings are overwritten. By pressing the S1 key, the command Basic Load is started.

Causes:

- The motor has been exchanged.
- A parameter file has been loaded, but the parameter **S-0-0141, Motor type** contained a motor type different from the present one.

Remedy:

Command **C700 Basic Load** or press the S1 button.

See also the functional description: "Automatic Execution of the Load Default Feature".

F209 PL Load parameter default values

After replacing the firmware version, the drive displays “**PL**”, if the parameters have been changed in regards to the old product. By pressing the S1 button on the drive controller or by starting the command “load basic parameters”, all the parameters will be erased and restored with the default (initial) values.

Cause:

The firmware has been exchanged; the number of parameters in comparison to the old product has changed.

Remedy:

Press S1 button on the drive controller, and all the parameters will be erased and restored with the factory preset default values

WARNING This overwrites all parameters and positioning blocks.

See also the functional description: "Basic parameter block".

F218 Amplifier overtemperature shutdown

The temperature of the amplifier’s heatsink is monitored. If the heatsink is too hot, the drive will power down in order to protect against damage.

Cause:

1. Ambient temperature is too high. The specified performance data are valid up to an ambient temperature of 45°C.
2. The amplifier’s heatsink is dirty.
3. Air flow is prevented by other assembly parts or the control cabinet assembly.
4. Blower defective.
5. E219: Sensor defective appears prior to shutdown of unit

For Remedy:

1. Reduce the ambient temperature, e.g. through cooling of the control cabinet.
2. Remove obstructions or dirt from the heatsink.
3. Install the device vertically and clear a large enough area for proper heatsink ventilation.
4. Exchange drive.
5. Exchange drive.

F219 Motor overtemperature shutdown

The motor has heated up too much.

As soon as the temperature error threshold (155°C) has been exceeded, the drive is immediately decelerated according to the error reaction selected (P-0-0119, Best possible deceleration). As soon as the calculated temperature of the motor has exceeded the shutdown threshold, the drive is immediately decelerated according to the error reaction selected (P-0-0119, Best possible deceleration).

The following applies:

temperature warning threshold < temperature error threshold

See also **E251 Motor overtemp. prewarning**

Cause:

1. The motor is **overloaded**. The effective torque demanded from the motor has been above the allowed continuous torque for a too long time.
2. **line interruption**, ground fault or short circuit in the line for motor temperature monitoring
3. **instability** in speed control loop

Remedy for:

1. Check the dimensioning of the motor. In the case of installations that have been operated for a long time, check whether the drive conditions have changed (with regard to dirt accumulation, friction, moved masses etc.).
2. Check line for motor temperature monitoring for line interruption, ground fault or short circuit.
3. Check parameterization of speed control loop.

See also Functional Description "Temperature Monitoring"

F220 Braking resistor overload shutdown

1. The regenerated energy from the mechanism of the machine via the motor has exceeded the capability of the braking resistor (bleeder). By exceeding the maximum energy of the resistor, the drive will shutdown according to the set error reaction, thereby protecting the bleeder from temperature damage.

Cause:

The reflected energy from the machine's mechanism over the motor is too great.

Remedy:

With too much power → reduce the acceleration value.

With too much energy → reduce the velocity.

Check the drive installation.

May require installation of an additional bleeder module.

2. The bleeder resistor is used as a charging resistor to load the DC bus capacitors.

Cause:

If a power failure has been programmed as a warning, then the softstart of the mains section can be started (controller turned on via the bleeder resistor on the mains). If the control does not bring the installation to a standstill once this warning is issued (the drive continues to receive power from the mains), then the bleeder monitor could be triggered.

Remedy:

- Set both power failure and undervoltage as a fatal warning. Then the drive prevents power input from the mains.
- The control switches the installation/machine off as soon as this warning is generated.
- Parametrize undervoltgage as an error, then the drive switches the machine off with the error reaction which has been set.

See also the functional description: "Current Limit".

F223 Error during initialisation of the parking axis

Cause:

After the start of command **S-0-0139, D700 Command Parking axis** the following is deactivated:

- Measuring system monitoring
- control loop monitoring and
- temperature monitoring

- At the end of the command, measuring system initialization is carried out. This means all initializations as with command **S-0-0128, C200 Communication phase 4 transition check** are carried out.
- If an error occurs during these initialization procedures, then error **F223 Error during initialisation of the parking axis** is generated. To specify the error more precisely, it is necessary to activate the transition command phase 3 to 4.

Recovery:

- bring drive into parametrization mode
- the switching command phase 3 to 4 must be started
- and the switching command error must be cleared

See also the functional description: "Command Parking Axis"

F224 Maximum braking time exceeded

Cause:

The decel time of the drive is monitored when the drive enable removed and given an error reaction with velocity-controlled standstill of the drive.

If maximum decel time is exceeded (Parameter **P-0-0126, Maximum braking time**), then the drive is brought to a torque-free standstill and error **F224 Maximum braking time exceeded** is generated.

Remedy:

1. extend **P-0-0126, Maximum braking time**
2. increase brake ramp of error reaction
3. P-0-1203, P-0-1201 or P-0-1211 and P-0-1213.
4. reduce external moment of inertia
5. increase torque limit value

Also see the function description: "Motor Holding Brake".

F226 Undervoltage in power section

The level of the DC bus voltage is monitored by the drive controller. If the DC bus voltage falls below a minimal threshold, the drive independently shuts down according to the set error reaction.

Cause:

1. The power source has been interrupted without first switching off the drive enable (RF).
2. Disturbance in the power supply

Remedy for:

1. Check the logic regarding the activation of the drive within the connected control.
2. Check the power supply.

See also the functional description: "Drive enable or drive start"

F228 Excessive deviation

When the position loop is closed, the drive monitors whether it is able to follow the specified command value. This is done by calculating a model position value in the drive and comparing that value with the actual feedback value. If the difference between theoretical and actual position value permanently exceeds the value of the **S-0-0159, Monitoring window** parameter, the drive obviously cannot follow the given command value. Then this error is generated.

Cause:

1. The drive's **acceleration** capacity has been exceeded.
2. The axis is **blocked**.
3. Incorrect parameter values set in the drive parameters.
4. Incorrect parameter values in **S-0-0159, Monitoring window**.

Remedy:

Ref. 1. Check the **S-0-0092, Bipolar torque/force limit value** parameter and set it to the maximum permissible value of the application. Reduce the specified acceleration value from the controller (see controller Manual).

Ref. 2. Check the mechanical system and eliminate jamming of the axis.

Ref. 3. Check the drive parameters (control loop tuning).

Ref. 4. Set the parameter values of **S-0-0159, Monitoring window**.

See also the functional description "Position Control Loop Monitoring".

F237 Excessive position command difference

Cause:

When the drive is operating in position control, incoming position command values are monitored. If the velocity required of the drive by two successive position command values is greater than or equal to the value in **S-0-0091, Bipolar velocity limit value**, position command value monitoring is initiated. The **Excessive position command value** is stored in parameter **P-0-0010**. The **last valid position command value** is stored in parameter **P-0-0011**.

If position data are to be processed in modulo format, then the interpretation of the command is also dependent on the value set in **S-0-**

0393, Command value mode for modulo format. The parameter should be set for the "shortest path" (0).

Remedy:

Compare S-0-0091, Bipolar velocity limit value with the velocity in the program and adjust to match it, if necessary.

F248 Low battery voltage

Cause:

For motors of series MKD and MKE, the absolute position information is stored by a battery-powered electronic in the motor feedback. The battery is designed for a 10-year life span. If the battery voltage falls below 3.1 V, this message appears. The absolute encoder function will still be preserved for about 2 weeks. Beim Ecodrive Cs befindet sich die Batterie hinter einer Abdeckung im

Front Panel. Dieses kann ohne Werkzeug geöffnet werden.

Malfunction in the control of motors and moving elements!

CAUTION Replace the battery as soon as possible.

Instructions for Exchanging Batteries

- New packaged battery

Malfunction in the control of motors and moving elements!

CAUTION Turn off the power supply. Make sure it will not be turned back on. Exchange the battery while the control voltage (24V) is turned on.

If the control voltage is turned off while the battery is taken out, the absolute **reference** point will be lost. Then, the reference point must be re-established with the command "**Set absolute measuring**".

Removing the Battery

- Pull out the resolver feedback (RSF) lid by hand.
- Pull off the battery connector.
- Loosen battery clamp and remove the battery.
- Place the prepared battery in the housing and screw on the clamp. **Attention!** Do not kink or clamp the battery cable.
- Attach the connector of the battery.
- Close the resolver feedback lid, screw in 4 torx screws and tighten to 1.8 Nm with the torque wrench.

Note: If a customer password was activated and the drive controller locked, the error **F2486 Low battery voltage** cannot be cleared. The drive controller first has to be unlocked.

F250 Overflow of target position preset memory

Cause:
If the attempt is made in mode "Running the positioning command value" to set a new positioning command value while toggling parameter **S-0-0346, Positioning command latch** even though the previous positioning command value (k+1) has not yet been assumed (because the previous positioning command value (k) has not yet been run to), then error **F250 Overflow of target position preset memory** was generated.

Remedy:

- Wait until the position is run to.
- Use a different positioning mode (e.g., immediate acceptance).

See also functional description: "Acknowledging command value latch".

F253 Incr. encoder emulator: pulse frequency too high

Cause:

The incremental encoder emulator can process a maximum of 2047 increments per sample period 500µs); this value has been exceeded.

Remedial action:

1. Reduce the **number of lines** of the incremental encoder emulator (P-0-0502).

or

2. Reduce the travel **velocity**.

See function description: "Activating Encoder Emulation".

F260 Command current limit shutoff

If the current setpoint reaches the peak value, then warning **E260 Command current limit shutoff** is generated. If the limit remains standing for more than 1.5 ms or if bit 13 = 1 in parameter **P538, Motor function parameter 1**, then the drive is shutdown with error message **F260 Command current limit shutoff**.

Error cause:

1. Motor power cable has not been connected.
2. Motor holding brake not released (not connected).
3. The axis is mechanically jammed.
4. Acceleration time exceeds maximum torque greater than 1.5s.
5. Acceleration torque equals limit torque.

The error message can be switched off in the motor function parameters.

F262 External short at status outputs

Status outputs are monitored for short circuits and thermal overload.

- If output current exceeds 350mA for about 1µs, then this is acknowledged as a short circuit and the pertinent channel is shut off. The output remains off unit the error is cleared.
- With thermal overload, the error is set and the output(s) shut off. After the driver has cooled off, the outputs are switched back on and so on. The error, however, remains until it is cleared. Thermal overload can occur if several outputs are overloaded in excess of 80 mA.

Note: Light bulbs, for example, cannot be controlled as their inrush current causes a short-circuit.

Cause:

1. Short circuited outputs
2. One or more outputs are overloaded.

Remedy:

For 1. Eliminate short circuit or limit switching current (< 350 mA)

For 2. Drop current, depending on output, to < 80 mA.

See also the functional description: "Setting the Operating Mode Parameters".

F267 Erroneous internal hardware synchronization

Cause:

The drive control is synchronized on the bus interface (SERCOS, Profibus, Interbus, ...). The correct function of the synchronization is monitored. If the average value of the deviation exceeds 5 µs, this error is generated.

Remedy:

Replace drive controller.

F269 Error during release of the motor holding brake

After drive enable is set or while running the brake monitor command the motor does not move despite that. The motor torque command is equal to the brake holding torque.

Cause:

1. Motor brake not connected
2. Axis mechanically jammed
3. Frictional torque > brake nominal torque

Remedy for:

1. Connect brake
2. Check mechanics and eliminate jam
3. Switch brake monitor off

See also the functional description: "Motor Holding Brake"

F276 Absolute encoder out of allowed window

When turning off the drive controller with an absolute encoder, the actual feedback position will be stored. When powered up, the absolute position given by the encoder is compared with the stored position. If the divergence is greater than the parameterized **P-0-0097, Absolute encoder monitoring window**, the error **F276** is generated and transferred to the control unit.

Cause:

1. Turning on for the first time (invalid stored position).
2. While turned off, the axis was moved further than the distance parameterized in **P-0-0097, Absolute encoder monitoring window**.
3. Incorrect position initialization.

Remedy for:

1. Press S1 to reset the error and set the absolute position.
2. The axis was moved while turned off and sits outside of its permissible position. Check to see if the displayed position is correct in relation to the machine zero point. Then reset the error.
3. Check whether the error is generated again. If yes, the electronics module is possibly defective and will have to be replaced.

WARNING

An accident may occur by accidental axis movement. Check absolute position information. The feedback is defective if the absolute position information is wrong. The motor should be exchanged and sent to the Rexroth Indramat Customer Service.

Note: If a customer password is activated and the drive controller is locked, then error **F276 Absolute encoder out of allowed window** cannot be reset. The drive controller must be unlocked first.

See also the functional description "Absolute Encoder Monitoring".

F277 Current measurement trim wrong

The current reading in the drive controller is compensated for during operation. The compensation values are stored in parameters **P-0-4000** and **P-0-4001**. These values are queried to ensure they maintain the tolerance of +/-10 %. Should the values be greater, then this error is generated.

Cause:

Hardware defective in the drive controller.

Remedy:

Replace hardware.

F281 Mains fault

Cause:

The power supply voltage was not present during operation for at least 3 power periods. As a result, the drive controller was brought to a standstill according to the set error response.

Remedy:

Check the power supply connection according to the project planning specifications.

See also the functional description: "Current Limit"

F401 Double MST failure shutdown

The master sync telegram was not received in the drive controller in two successive SERCOS cycles.

Cause:

1. Disruption in the fiber optic transmission line.
2. Too much attenuation of the light signal.
3. Malfunction in the SERCOS interface (general).

Remedy for:

1. Check all fiber Optic connections in the SERCOS ring.
2. Measure the attenuation in the fiber optic cable.
3. The maximum attenuation between TX and RX must not fall below 12.5 dB.
4. Exchange the SERCOS interface module in the drive controller.

See also the functional description: "SERCOS Interface Error"

F402 Double MDT failure shutdown

The master data telegram (MDT) has not been received in the drive over the course of two successive SERCOS or fieldbus cycles.

Cause:

1. Fiber optic bus: interference in the fiber optic transmission
2. Fiber optic bus: light signal input power too low
3. SERCOS: problem in SERCOS interface (general)
4. Fieldbus: bus connection terminated/blocked longer than watchdog duration
5. The bus master is no longer sending cyclic telegrams to the drive, although they are expected in phase 4.

Remedy for:

1. All fiber optic cable connections in SERCOS ring must be checked.
2. The fiber optics power read at the receiver (test mode: continuous light) must lie between the range of –20dBm (10µW) and –5dBm (320µW). If it does not, then adjust transmission power or check attenuation of the fiber optic cable (maximum attenuation between TX and RX may not exceed 12.5 dB!)
3. SERCOS interface module in drive has to be replaced.
4. Check fieldbus connector and cable connections, signal level.
5. Switch master on and start up cyclic communications, see Control Manual.

See also the functional description: "SERCOS Interface Error"

F403 Invalid communication phase shutdown

An invalid communications phase was given by the SERCOS master module (phase > 4).

Cause:

Error in the SERCOS master module of the control system.

Remedy:

Consult the control system manufacturer.

See also the functional description: "SERCOS interface error"

F404 Error during phase progression

The prescribed order was not maintained during phase progression.

Cause:

Error in the SERCOS master module of the control system.

Remedy:

Consult the control system manufacturer.

See also the functional description: "SERCOS interface error"

F405 Error during phase regression

Switching back from a communication phase did not switch to phase 0.

Cause:

Malfunction in the SERCOS master module of the controller.

Remedy:

Contact the controller manufacturer.

See also the functional description: "SERCOS interface error"

F406 Phase switching without ready signal

The SERCOS master attempted a phase switch without waiting for the drive controller's ready signal.

Cause:

Error in the SERCOS master module of the control system.

Remedy:

Consult the control system manufacturer.

See also the functional description: "SERCOS interface error"

F407 Error during initialization of master communication

An error occurred during the initialization and check of the master communication interface between drive processor and field bus processor.

Note: This error cannot be cleared and the drive remains in phase 2. It is possible to parameterize the axis and carry out a firmware update with DOLFI. The axis, however, cannot be moved!

Cause:

The error **F407 Error during initialization of master communication** is entered, if

- there has no master communication card been plugged in.
- the wrong master communication card has been plugged in.
- the master communication firmware is not running (timeout).
- an error of the master communication card has occurred.

Remedy:

- Plug in the right master communication card
- Replace the firmware

F408 Fatal error of the interface card

The fieldbus interface has detected a fatal error.

Cause:

1. The watchdog of the interface card has been triggered.
2. A non-permitted memory access follows.

Recovery:

Switch unit off and on and if error still pending, replace hardware.

F409 Bus failure

After the fieldbus has been initialized and everything is running, the watdchdog of the fieldbus was triggered, i.e,. communications with the fieldbus master is no longer possible.

Cause:

1. The fieldbus card connector has been pulled.
2. The fieldbus cable is faulty.
3. The master is not sending a telegram.

Recovery:

On 1. Ensure that the fieldbus card connector is correctly inserted.

On 2. Check fieldbus cable for faults.

On 3. Check master.

F410 Synchronization with field bus impossible

A connection to the drive cannot be established in profile type „cyclical position control“.

Cause:

1. The cycle time of the fieldbus was incorrectly set.
2. Sercos cycle time (S-0-0002) was incorrectly set.
3. The fieldbus is only active during synchronization.

Recovery:

On 1 and 2. The cycle time of the fieldbus and Sercos cycle time must have the correct ratio. As the Sercos cycle is derived from the fieldbus cycle time the Sercos cycle must either be adapted in the event of an error (cycle time of the fieldbus is fixed) or vice versa (Sercos cycle fixed).

On 2. In drive phase 3 it is attempted to synchronize Sercos cycle of drive to cycle time of fieldbus. This takes some time. If the connection to the master should be interrupted during this synchronization phase, then the fieldbus card cannot established synchronization and the connection to the master cannot be interrupted.

F434 Emergency-Stop

Pressing the emergency stop switch (E-Stop) has caused the drive to perform the emergency stop function that was selected in the **P-0-0119, Best possible deceleration** parameter. Setting bit 15 of **S-0-0011, Class 1 diagnostics** causes an error message to be issued to the controller.

Cause:

The emergency stop switch has been pressed.

Remedy:

Eliminate the malfunction that has caused the emergency switch to be actuated, and clear the error.

See also the functional description: "Emergency stop feature".

F629 Positive travel limit exceeded

The drive has received a command value which has led to an axis position outside the positive travel range. The axis has been brought to a standstill with the error response "Set velocity command value to zero".

Bit 2 of paramater **P-0-0090, Travel limit parameter** is set for "Exceeding travel range is an error", or after exceeding the position limit a drive control command has been started (such as the drive-controlled homing procedure).

Cause:

S-0-0049, Positive position limit value exceeded.

Remedy:

1. Check **S-0-0049, Positive position limit value**
2. Check the software limits of the control system
3. Activate the axis after the error response

Procedure:

- Clear the error.
- If the power supply was turned off, turn it back on.
- Move the axis into the permissible working range.

Note: Only command values which lead back into the allowed working range will be accepted. With other command values, the drive will stop again. - The parameter **S-0-0057, Position window** defines a tolerance for the travel limits.

See also the functional description: "Travel Range Limits".

F630 Negative travel limit exceeded

The drive has received a command value which has led to an axis position outside the negative travel range. The axis has been brought to a standstill with the error response "Set velocity command value to zero".

Bit 2 of paramater **P-0-0090, Travel limit parameter** is set for "Exceeding travel range is an error", or after exceeding the position limit a drive control command has been started (such as the drive-controlled homing procedure).

Cause:

S-0-0050, Negative travel limit value exceeded.

Remedy:

1. Check **S-0-0050, Negative travel limit value**.
2. Check the software limits of the control system.
3. Activate the axis after the error response.

Procedure:

- Clear the error.
- If the power supply was turned off, turn it back on.
- Move the axis into the permissible working range.

Note: Only such command values which lead back into the allowed working range will be accepted. With other command values, the drive will stop again. - The parameter **S-0-0057, Position window** defines a tolerance for the travel limits.

See also the functional description: "Travel Range Limits".

Rexroth Bosch Group

F634 Emergency-Stop

Pressing the emergency stop (E-Stop) switch has caused the drive to stop by setting the velocity command value to zero. An error is reported in the **S-0-0011, Class 1 diagnostics** parameter.

Cause:

The emergency stop switch has been pressed.

Remedy:

Eliminate the malfunction that has caused the emergency switch to be actuated, and clear the error.

See also the functional description: "Emergency stop feature".

F643 Positive travel limit switch detected

The positive travel range limit switch has been activated. The axis was brought to a standstill with error reaction "Velocity command value to zero".

In **P-0-0090, Travel limit parameter** bit 2 has been set as "travel range overrun treated as error" or a drive control command was started after the end switch had been actuated (e.g., drive-controlled homing).

Cause:

The positive travel range limit switch has been activated.

Remedy:

1. clear error
2. turn power source back on
3. move axis into the allowed travel range

Note: The drive will not accept command values which lead out of the permissible travel range. Entering these command values in the drive controller will result in this error.

See also the functional description: "Travel Range Limits".

F644 Negative travel limit switch detected

The negative travel limit switch has been activated. The axis has been brought to a standstill with the "Set velocity command value to zero" error response.

Bit 2 of parameter **P-0-0090, Travel limit parameter** is set for "Exceeding travel range as error", or a drive control command has been started (such as the drive-controlled homing procedure). with the limit switch already actuated.

Cause:

The negative travel limit switch has been activated.

Remedy:

1. Reset the error.
2. Turn the power supply on again.
3. Move the axis into the permissible travel range.

Note: The drive will not accept command values which lead out of the permissible travel range. Entering these command values in the drive controller will result in this error.

See also the functional description: "Travel Range Limits".

F811 Commutation offset could not be determined

The automatic commutation adjustment has tried to determine the commutation offset. This has failed.

Cause:

1. The motor could not move freely.
2. Direction of movement of the encoder is incorrect.
3. Incorrect polarity of the motor.
4. Axis mechanically blocked.
5. Brake applied.
6. Axis is in endstop position.

Remedy:

1. Check mechanically whether the motor can be moved.
2. Check the encoder. Invert the direction of movement of the encoder, if necessary.
3. Check motor connection to the controller.
4. Release mechanical blocking.
5. Check brake and control signals. The brake must be released immediately when the controller enable signal is set.
6. Make sure the axis does not remain in endstop position.

See also functional description: "Determining the commutation offset"

F812 Motion range exceeded during commutation

A range of +/- 1 pole pair distance is defined, within which the axis may move during the Automatic Commutation adjustment. If this range is exceeded, this error message appears.

Cause:

1. The drive enable has been set while the axis was still in motion.
2. The axis has been moved by a mechanical force.
3. Parameters **P-0-0560** Commutation adjustment current and **P-0-0562** Commutation adjustment periodic time are set too high. Possibly the mechanical properties of the axis, like friction or weight load, have changed.

Remedy:

1. Wait until the axis motion stops and set the drive enable once again.
2. Inhibit the influence of the mechanical force.
3. Reduce the parameter values for **P-0-0560** Commutation adjustment current and **P-0-0562** Commutation adjustment cycle time. You can also set them to the default values **P-0-0560** Commutation adjustment current = 25 % and **P-0-0562** Commutation adjustment cycle time = 4 milliseconds.
4. Afterwards, start the command D300 Commutation adjustment to evaluate once again the optimal parameters.

See also the functional description: "Asynchronous Motors"

F818 Amplifier overtemperature shutdown

In the power stage of the drive controller the temperature was detected to be inadmissibly high. The drive controller has output the **E250 Amplifier overtemp. prewarning**. Thereafter the amplifier is switched off and generates the mentioned error message.

Cause:

1. failure of the air conditioning for the control cabinet
2. incorrect dimensioning of the control cabinet with regard to heat discharge

Remedy:

1. establish function of the air conditioning for the control cabinet
2. check dimensioning of the control cabinet

F822 Encoder 1 failure: signal amplitude wrong

The analog signals of a motor measurement system are used for high resolution analysis of that measurement system. These are monitored according to two criteria:

1. The pointer length, which is calculated from the amplified sine and cosine signals, must be >5 V while the encoder frequency is <10 kHz. Above that frequency it must be >1 V.
2. The maximum pointer length resulting from the sine and cosine signals must not exceed 11.8 V.

$$[\mathrm{V}] \quad \textbf{pointer length} = \sqrt{\sin^2 + \cos^2}$$

Fig. 4-2: Pointer length

For checking purposes the encoder signals can be routed to the analog output of the controller. This is done through the following parameter setting:

Channel 1:

P-0-0420 = 0; P-0-0421 = 1 (SIN encoder 1); P-0-0422 = 1.0

Channel 2:

P-0-0423 = 0; P-0-0424 = 2 (COS encoder 1); P-0-0422 = 1.0

The input amplifier amplifies the 1Vss encoder signal to the nominal pointer size of

0.5V * 18.4 = 9.2V

which is then output. So with the appropriate setting of the oscilloscope (X-Y operation mode) the following signal wave form is produced:

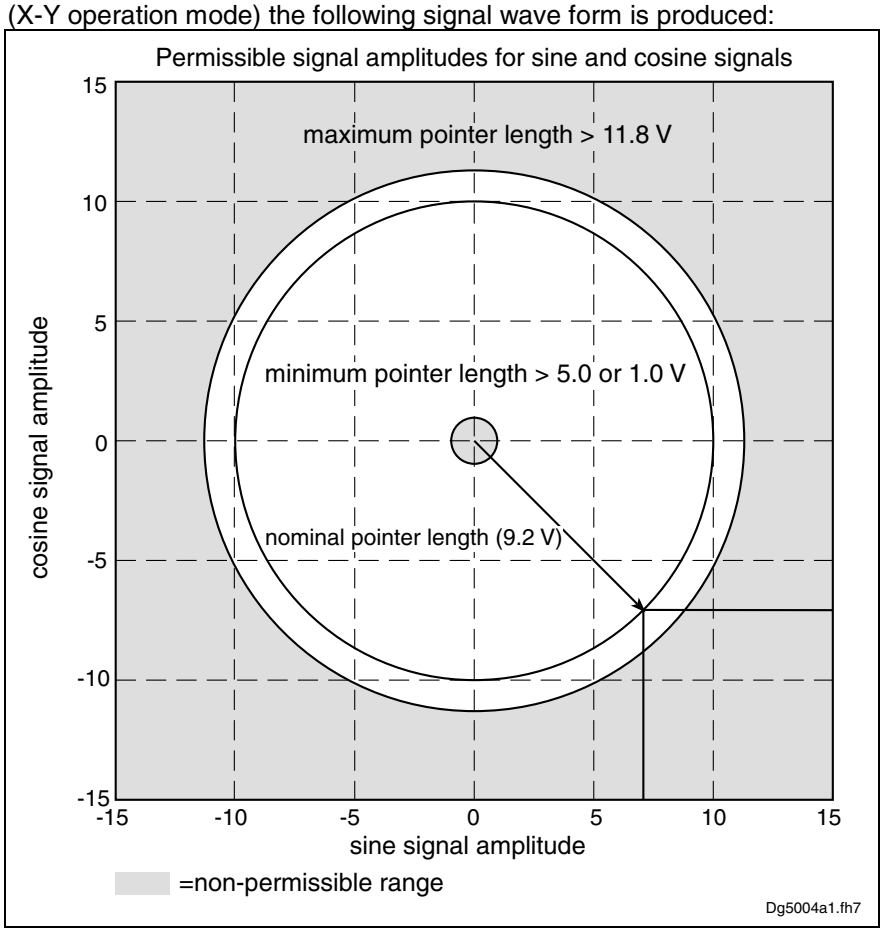

Fig. 4-3: Correct signal amplitude

Example:
Ucos = -6,5 V
Usin = 6,5 V

$$\text{pointer length} = \sqrt{(-6.5\text{V})^2 + 6.5\text{V}^2} \approx 9.2\ \text{V}$$

Note: The error cannot be cleared in communications phase 4. Before clearing the error, switch to communications phase 2.

Note: When an incremental encoder with squarewave signals is used, the signal is not monitored.

Cause:

1. Defective encoder cable
2. Disruptive electro-magnetic interference on the encoder cable
3. Defective encoder

Remedy:

1. Check the measurement system cable.
2. Lay the feedback cable well away from the motor power cable. The cover must be placed over the drive controller (see drive controller project specifications.)
3. Check the measurement system and exchange, if necessary.

F825 Overvoltage in power section

The DC bus voltage is too high.

Cause:

1. When braking: The energy regenerated via the motor by the mechanical system of the machine was so high for a short time that it was impossible for the braking resistor (bleeder) to convert it to heat in a sufficient way. It was impossible to discharge the regenerated current which charged the DC bus so that the DC bus voltage became too high.
2. Mains voltage (alternating input voltage) too high.

Effect:

In the case of overvoltage, the motor torque is disabled.

Remedy:

For 1. Reduce **acceleration values**.
Check drive dimensioning, if necessary.
Use additional braking resistor, if necessary.

For 2. Check **mains supply voltage** (alternating voltage/3-phase).

WARNING

⇒ Danger by high voltage!
Provide touch guard.

F860 Overcurrent: short in power stage

The transistor (IGBT) current has exceeded the allowed maximum peak value. The drive is immediately disabled, the motor freewheels to a stop.

Cause:

1. Short circuit in the motor or motor cable.
2. Defective power section of the drive controller
3. The current regulator was parameterized with wrong values.

Remedy:

1. Check the motor cable for a short.
2. Exchange the drive controller.
3. Check that the current controller parameters are as given in the motor data sheet; if they differ, input the correct values.

F870 +24Volt DC error

The drive controller requires a 24V control voltage. The drive's torque is released immediately when the maximum permissible tolerance of +-20 % is exceeded. If an optional electrically released motor holding brake is present, then it is activated.

Cause:

1. 24V power supply **overload**.
2. Defective power **supply unit**.
3. **Short-circuit** in the emergency stop circuit.

Remedy:

1. Check the 24V power at the power supply unit.
2. Check the power supply unit.
3. Check the emergency stop circuit for a short-circuit.

Note: This error can only be cleared in parameter mode (phase 2). As a result of this error, the encoder emulation is switched off.

F878 Velocity loop error

The velocity loop monitor will appear when the following conditions occur simultaneously:

- The current command value is at the peak current limit.
- Command accel and actual velocity have different qualifying signs
- Actual velocity > 20 rpm or 20 mm/min
- Command and actual acceleration have different qualifying (+/-)signs.

Cause:

1. Motor cable is connected incorrectly.
2. Defective controller section of the drive
3. Defective feedback
4. Velocity loop paramatrized incorrectly
5. Incorrect commutation offset

Remedy:

1. Check the motor cable connection.
2. Exchange the drive controller.
3. Exchange the motor.
4. Check the velocity controller to see whether it is within operational parameters.
5. Exchange the motor.

see also the functional description: "Determining the Velocity Controller Setting".

see also the functional description: "Determining commutation offset"

F879 Velocity limit S-0-0091 exceeded

In torque control, the actual velocity is monitored. This error is generated if the programmed velocity in the **S-0-0091, Bipolar velocity limit value** parameter is exceeded by the 1.125-fold value or a minimum of 100 rpm (rotary motor) or by 100 mm/min (linear motor).

Cause:

The torque command value was for too long a time greater than the load torque. This causes the actual speed to increase up to the maximum possible motor speed.

Remedy:

Assign the correct torque command value for the required task. Reduce the **S-0-0092, Bipolar torque/force limit value** parameter value.

See also the functional description "Limiting to Bipolar Velocity Limit Value".

4.2 Warning Diagnostic Messages E…

Warnings do not lead to an automatic shutdown.

Many functions are monitored subject to operating modes and parameter settings. As a result, if a state is discovered which is still allowed by the order of operation, but in continuous operation generates an error and thereafter leads to shutdown of the drive, a warning will be generated in the case where this state appears again.

Warning Classes

The warning class is evident from the diagnostic message.

Warnings can be separated into 2 classes. They differentiate if the drive will perform an automatic response with the appearance of a warning.

Warning class	Diagnostic message	Drive reaction
With drive reaction	E8xx	Drive stop
Without drive reaction	E2xx	--

Fig. 4-4: Division of the warning class

Warnings can not be externally deleted.

E225 Motor overload

The maximum possible motor current is reduced in order to protect the motor from being destroyed.

If a current flows in the that is greater than 2.2 times the motor current at standstill S-0-0111, the maximum possible motor current **(S-0-0109, Motor peak current)** is reduced. With 4-fold motor current at standstill, the reduction starts after 400 ms. With 5-fold current it starts earlier, and with 3-fold current later. The **E225 Motor overload** warning is issued when the motor peak current is reduced by the limitation.

The reduction also has an effect on the **P-0-4046, Active permanent current**.

See also the functional description: "Current Limit"

E226 Undervoltage in power section

If bit 5 was set in the **P-0-0118, Power off on error** parameter, the undervoltage will be handled as a non-fatal warning. The drive generates this warning when the DC bus voltage of the supply unit fails and drive enable is present.

Cause:

Mains failure occurs with drive enable having been set.

Remedy:

Switch off drive enable before switching off the supply unit.

E247 Interpolation velocity = 0

The drive-internal position command value interpolator is active if

- the "drive-internal interpolation" mode
- the "relative drive-internal interpolation" mode
- drive-controlled homing
- jog
- drive halt
- process block mode

is active.

The **E247** warning is issued if the employed velocity specification is 0. Possible velocity specifications are:

- S-0-0259, Positioning velocity
- S-0-0041, Homing velocity
- S-0-0091, Bipolar velocity limit value
- P-0-4030, Jog velocity
- P-0-4007, Process block velocity

Note: Warning **E247** is suppressed if **S-0-0259, Positioning Velocity** is cyclically configured.

See also the functional description: "Operating Mode: Drive Internal Interpolation"

E248 Interpolation acceleration = 0

Cause:

The drive internal position command interpolator (profile generator) is active. It has been given the acceleration = 0. Without acceleration, it can never reach a given speed.

Note: Input parameter values are converted into a drive internal format, so an input acceleration word > 0 can, when converted, result in an acceleration = 0. The parameter values which, internaly, result in an acceleration > 0, can be calculated using the formulas found in the chapter entitled "**Drive-internal format of position data**"

Operation modes with drive internal position command generation:

1. Drive-internal interpolation
2. Relative drive-internal interpolation
3. Drive-controlled homing
4. Drive Halt
5. Process block mode
6. jog

Remedy:

Input a reasonable value > 0 for the employed acceleration. Possible acceleration specifications, depending from the operation mode, are:

For 1, 2 and 6:	**S-0-0260**, **Positioning acceleration**	**>0**
For 3.:	**S-0-0042, Homing acceleration**	**>0**
For 4.:	**S-0-0138, Bipolar acceleration limit value**	**>0**
For 5.:	**P-0-4008, Process block Acceleration**	**>0**

See also the functional description: "Operating Mode: Drive Internal Interpolation"

E249 Positioning velocity >= S-0-0091

Cause:

Operating modes with internal interpolation limit the positioning speed to that set in **S-0-0091, Bipolar velocity limit value.**

This applies to the following modes:

1. Drive Internal Interpolation
2. Relative drive-internal interpolation
3. Positioning Block Mode
4. Jogging

Remedy:

S-0-0259, Positioning Velocity or

P-0-4007, Process block velocity or

P-0-4030, Jog velocity

must be reduced

See also functional description: "Operating Mode: Drive Internal Interpolation".

E250 Amplifier overtemp. prewarning

The temperature of the heatsink in the drive controller has reached the maximum permissible temperature. The drive controller follows the command value input for a period of 30 seconds. This makes it possible to bring the axis to a standstill with the control system while keeping true to the process (for example, close the operation, leave the collision area, etc.).

After 30 seconds, the response set in parameter **P-0-0119, Best possible deceleration** will be performed by the drive controller.

Cause:

1. Failure of the drive's internal blower.
2. Failure of the control cabinet's climate control.
3. Incorrect control cabinet sizing in regards to heat dissipation.

Remedy for:

1. If the blower fails, exchange the drive controller.
2. Install climate control feature in the cabinet.
3. Check the sizing of the control cabinet.

See also the functional description: "Current Limit"

E251 Motor overtemp. prewarning

As soon as the temperature **warning threshold** (145°C) is exceeded, the warning E251 is output, and the drive keeps on following the command value.

This state can last for a long time without powering down. Only when the temperature **error threshold** is exceeded, an immediate powering down will take place.

See also **F219 Motor Overtemperature Shutdown**.

Cause:

The motor is overloaded. The effective torque required from the motor was above the allowable standstill continuous torque for too long.

Remedy:

Check the installation of the motor. For systems which have been in use for a long time, check to see if the drive conditions have changed (in regards to pollution, friction, moving components, etc).

See also the functional description: "Temperature Monitoring".

E252 Braking resistor overload prewarning

Cause:

The braking resistance (bleeder) in the amplifier is charged with the reflected energy from the motor by about 90%. The bleeder overtemperature warning shows that an overload of the bleeder is expected if the feedback energy increases on and on.

Remedy:

Reduce the acceleration value or velocity. Check the drive installation.

E253 Target position out of travel range

In operation modes with drive controlled interpolation, the drive checks **before the move** whether the specified **S-0-0258, Target position**, is within the possible travel range of the drive. This range is defined by the parameters **S-0-0049, Positive position limit value** and **S-0-0050, Negative position limit value**. The position limit check is activated in the parameter **S-0-0055, Position polarities** with bit 4.

Cause:

The target position lies beyond the position limits, and the position limit check is activated.. The motion profile results in a target position greater than the maximum allowed position.

Results:

- This warning message, E253, appears.
- The drive stops.
- The drive does not accept the target position or the process block.
- In **S-0-0012, Class 2 diagnostic** warning bit 13 is set.

Remedy:

- For the Drive controlled interpolation mode, input the **S-0-0258, Target position** only within the position limits.
- Don’t input moves which are greater than the maximum allowed position minus the current position.
- In positioning-sequence operating mode always set **S-0-4006, Command Targetposition** smaller than the maximum allowed position.
- The same holds for Relative Positioning commands, where the sum of the commanded positions + the start position should be less than the maximum allowed position.
- Check the **position limit values**. Moreover, the positive position limit value must be greater than the negative position limit value.
- If you don’t need the position limit check, de-activate it, e.g. in modulo mode.

See also the functional description: "Operating Mode: Drive Internal Interpolation".

E254 Not homed

If "absolute positioning" is selected while in the operation mode "position block", the control drive must be homed to a reference position. If this is not the case, an absolute position cannot be reached. The drive rejects this positioning command and stops. The warning E254 will be given.

Cause:

Absolute positioning was selected without the drive being referenced.

Remedies:

1. Do the homing (referencing) command with the drive or
2. do only relative positioning.

See also the function description "Drive-Controlled Homing".

E255 Feedrate-override S-0-0108 = 0

With the parameter **S-0-0108, Feedrate override**, the travel velocity of all drive-controlled travel commands can be changed proportionally (in %). If the value of this parameter is 0, the travel velocity is also 0. With velocity = 0, the motor remains stationary despite having a commanded value.

Cause:

1. The parameter **S-0-0108, Feedrate override** is 0.
2. For devices with analog inputs: Feedrate override via analog input is activated, and the voltage at the analog input is 0.
3. The **feed potentiometer** of the connected control system is at 0 or is being evaluated incorrectly.

Remedies for:

1. Set **Feedrate override > 0**, so that the drive moves. Full speed is attained with 100 %.
2. Apply a voltage > 0 proportional to the desired speed, +10 V corresponds to 100 % (full) speed. Alternative: De-activate Feedrate override.
3. Turn the feed potentiometer cautiously, check the analog signal and the evaluation for it.

See also the functional description: "Drive-Controlled Homing".

E256 Torque limit = 0

Cause:

1. For protection against mechanical overload, the maximum torque can be limited by the **S-0-0092, Bipolar Torque Limit** parameter. If the actual value of this parameter is equal to 0, the motor does not develop torque and does not follow the given command values.
2. Torque reduction is set via an analog channel, and the applied voltage amounts to 10 V.

Remedy for:

1. Set the torque limit to a value greater than 0.
2. Establish an analog voltage smaller than 10 V.

See also the functional description: "Current Limit"

E257 Continuous current limit active

The thermal controller work load is monitored. If a command current profile is demanded from the drive controller and this profile is too high a load for the power transistors in the long run (too high temperature rise of the power output stage), the drive reacts by dynamically reducing the effective peak current. While doing this, this warning is output. The parameter **P-0-4046, Active peak current** is reduced. Before this real peak current limitation occurs, the pre-warning **E261 Continuous current limit pre-warning** should have been generated.

Cause:

The drive controller has been overloaded.

Remedy:

- Check the amplifier dimensioning.
- Reduce the acceleration.
- Check the sense of rotation of the motor encoder.

In the case of installations that have been operated for a long time, check whether the drive conditions have changed with regard to:

- friction
- moved masses.

See also the functional description: "Current Limit").

E258 Selected process block is not programmed.

Cause:

A positioning block was selected for which there is no set target position or positioning velocity, etc.

Remedy:

Select another positioning block or enter the required data.

See also the functional description: "Positioning Block Mode"

E259 Command velocity limit active

In the position control and velocity control operating modes, the effective velocity command value is limited to the value in parameter **S-0-0091, Bipolar velocity limit value**. The warning is given if the resulting velocity command value reaches this limit.

Cause:

Parameter **S-0-0091, Bipolar velocity limit value** was set too low.

Remedy:

In normal operating conditions, set parameter **S-0-0091, Bipolar velocity limit value** to a value 10% greater than the NC maximum velocity.

See also the functional description: "Limiting to Bipolar Velocity Limit Value".

E260 Command Current limit active

Description:

The warning shows that the speed controller is entering its limit. This means that the acceleration capacity of the drive has been exceeded. In position control mode this means that there is an ever-increasing deviation between command and actual values (lag error).

Remedy:

- In position control, reduce parametrized accel value or speed value so that the drive can follow the position command value.
- Increase torque limit value, if necessary.

Note: The warning can be deactivated via parameter **P-0-0538, Motor function parameter 1** (bit 11 = 0).

E261 Continuous current limit pre-warning

Digital drives are monitored by a continually operating temperature model. If the thermal load reaches 100%, the continuous current limit will be activated shortly thereafter and error **E257, Continuous Current Limit Active**, is displayed. Before the torque is reduced, a continuous current limit early warning is given via a switching threshold, which is determined by parameter **P-0-0127, Overload warning**. To deactivate the warning, enter **P-0-0127** = 100% into the parameter.

Cause:

The drive controller was overloaded.

Remedy:

1. Check the drive layout.
2. Reduce acceleration.
3. Increase the switching threshold in parameter **P-0-0127, Overload warning**
4. With systems which have been used for longer periods of time, check to see if drive controller conditions have changed in regards to:
   - Friction
   - Movements of the load
   - Feed during processing.

See also the functional description: "Current Limit"

E263 Velocity command value > limit S-0-0091

Cause:

S-0-0036, Velocity Command Value is outside the allowed range of values.

Remedy:

It is limited to **S-0-0091, Bipolar velocity limit value**.

See also the functional description: "Operating Mode: Velocity Control"

E264 Target position out of num. range

Cause:

In modes

- drive-internal interpolation,
- relative interpolation and
- positioning block mode

the previous target position in the internal position format cannot be reached.

Remedy:

1. Check the given target position and correct, if necessary.
2. With infinitely turning axes it is necessary that the position data be illustrated in modulo format.
3. The absolute internally illustrable position can be enlarged by enlarging the maximum travel range.

E269 Brake torque too low

When switching the drive enable off or with the brake monitoring command, the motor has moved while checking the brake torque. The motor holding brake thus no longer supplies the nominal torque.

Possible causes for the holding torque that is too low:

1. brake is covered with a layer of oxidization due to storage
2. brake is covered with oil or grease
3. brake is worn down

Remedy of:

1. if the warning occurs when the drive enable is removed, then start"command brake monitoring".
2. if the warning occurs with the removal of the drive enable, start "command brake monitoring". The command brake monitoring re-checks the brake torque. If the torque is too low, then the brake is re-ground. This re-grinding of the brake removes any residues or films. The brake should then bring its full torque.
3. if the brake is repeatedly re-ground yet the torque not achieved, then the motor holding brake must be replaced.

See also the functional description: "Motor Holding Brake"

E281 Mains fault

Cause:

The mains voltage has failed during operation for at least three mains cycles.

In parameter **P-0-0118, Power off on error** mains failure and undervoltage failure have been set as warnings.

The drive does not conduct an error reaction. If the drive continues to operate despite the warning, an **F220 Bleeder overload shutdown** could be generated.

Remedy:

Check the mains connections to ensure that they are as illustrated in the project planning manual.

See also the functional description: "Current Limit".

E401 Error in the parameter channel

Description:

The fieldbus card communicates during operation with the drive via SIS telegrams as well. A faulty SIS telegram was detected during processing.

Cause:

Error during internal SIS communications between fieldbus card and basic controller card.

E402 Error in the cyclic data channel

During the execution of a function, the drive has shown not to be ready for operation.

Cause:

This happens when you try to trigger functions on the drive which require e.g. that

- the drive's power is on
- the DRIVECOM state machine is up

E405 No data exchange possible via the field bus

Description:

Data exchange via the fieldbus is not possible.

Cause:

CANOpen:

1. The wrong baudrate is being used to go to the bus.
2. The bus cable is faulty.
3. The bus cable is too long for the baudrate that has been set.

Profibus:

1. The bus cable is faulty.
2. The bus cable is too long for the baudrate that has been set.
3. The master has not yet initialized the slave.

E408 Invalid addressing of MDT-data container A

This warning indicates an error during the index check in the multiplex channel. During the cyclical data exchange, the index for the access to the parameter S-0-0370, **Configuration list for MDT data container i**s monitored as to whether it points to a non-initialized field in the list. If it does, the warning E408 is generated.

E409 Invalid addressing of AT-data container A

This warning indicates an error during the index check in the multiplex channel. During the cyclical data exchange, the index for the access to the parameter S-0-0371, Configuration list for the AT data container i**s monitored as to, whether it points to a non-initialized field in the list. If it does, the warning** E409 **is generated.**

See also the functional description: "Checking the Indices"

E410 Slave not scanned or address 0

While the SERCOS ring is being initialized in communications phase 1, each slave which is to participate in the additional phase uptake must be addressed by the SERCOS master. Slaves which are not addressed or which have been set to drive address "0" indicate this by generating warning **E410**. Communication with these slaves in higher communications phases is not possible. They work only in pass through mode (i.e. they do not have an AT of their own, rather they serve only as a pass through for the SERCOS communication).

Cause:

- The slave was not scanned in phase 1, or address 0 is set.
- The slave is deactivated by the controller.

Remedy:

- Set the correct slave address.
- Check the SERCOS master configuration.

See also the functional description: "Adjustments of the SERCOS Interface"

E825 Overvoltage in power stage

The DC bus voltage is too high.

Cause:

1. During braking (decelerating): the energy regenerated from the mechanical system via the motor was so high for a moment that it could not be sufficiently dissipated to heat by the bleeder resistor. The regenerated current could not be dissipated and therefore charged the DC bus, so that the voltage has become too high.
2. The mains voltage (AC input) is too high.

Result:

In case of overvoltage, the motor is switched to torque-free operation. As soon as the DC Bus voltage falls again below the maximum allowable value, the controller will be turned on again.

Remedy:

For 1. Reduce the acceleration values.
Check the drive controller layout, if necessary.
Install an auxiliary bleeder, if necessary.

For 2. Check the mains supply voltage (AC/3phase).

WARNING

Danger of high-voltage shock!
Care for protection against accidental touch.

E826 Undervoltage in power section

If bit 3 was set in the **P-0-0118, Power off on error** parameter, the undervoltage will be handled as a "fatal warning“ with shutdown of the motive operation. The drive generates this warning when drive enable is present and the DC bus voltage message disappears.

Cause:

Mains failure occurs with drive enable having been set.

Remedy:

Switch off drive enable before switching off .

E829 Positive position limit exceeded

The drive has received a command value which resulted in an axis position outside the positive travel range. The axis has been brought to a standstill by setting the velocity command to zero. A class 1 diagnostic error is not generated. The drive will automatically follow command values that lead back into the allowed range. "Handle travel range exceeded as warning" is set in bit 2 of parameter **P-0-0090, Command value transmit time (TMTSG)**.

Cause:

S-0-0049, Positive position limit value exceeded.

Remedy:

Enter command values which lead back into the allowed range.

Note: Only such command values will be accepted that lead back into the allowed working range. With other command values, the drive will stop again. - The parameter **S-0-0057, Position window** defines a tolerance for the travel limits.

See also the functional description: "Travel Range Limits".

E830 Negative position limit exceeded

The drive has received a command value which resulted in an axis position outside the negative travel range. The axis has been brought to a standstill by setting the velocity command to zero. A class 1 diagnostic error is not generated. The drive will automatically follow command values which lead into the allowed range. "Handle travel range exceeded as warning" is set in bit 2 of parameter **P-0-0090, Travel limit parameter**.

Cause:

S-0-0050, Negative travel limit value exceeded.

Remedy:

Enter command values which lead back into the allowed range.

Note:	Only such command values will be accepted that lead back into the allowed working range. With other command values, the drive will stop again. - The parameter **S-0-0057, Position window** defines a tolerance for the travel limits.

See also the functional description: "Travel Range Limits".

E831 Position limit reached during jog

If the position limit monitor is activated and the drive is “IN REFERENCE", then it will be positioned on the position limit during movement by jogging. If the drive is positioned on the position limit or beyond the position limit, the drive stops and signals "Position limit value reached during jog".

Remedy:

1. Move the motor back within the allowed travel area with the jog function or
2. Turn off the position limit monitor.

See also the functional description: "Operating Mode: Jogging".

E834 Emergency-Stop

Pressing the emergency stop switch has caused the drive to perform the error reaction that had been selected via the **P-0-0119, Best possible deceleration** parameter. There is no error message issued to the controller.

Cause:

The emergency stop switch was pressed.

Remedy:

Eliminate the malfunction that led to the activation of the emergency stop switch. The warning will then disappear.

See also the functional description: "Emergency stop feature".

E835 Quick stop with probe detection is active

Probe 1 was parameterized with quick stop. The quick stop was activated by a positive edge at the probe input 1, i.e. the drive was immediately decelerated to velocity 0.

Cause:

With the mentioned parameterization, there was a positive edge at probe input 1.

Remedy:

- Clear parameter **S-0-0405, Probe 1 enable**
- Deactivate probe function by clearing parameter **S-0-0170, Probing cycle procedure command**

- Deactivate probe function by going back to communication phase 2 and progressing again to communication phase 4

see also functional description: "Probe Input Feature"

E843 Positive limit switch activated

The drive has received a command value which resulted in an axis position outside the positive travel range. The axis has been brought to a standstill by setting the velocity command to zero. A class 1 diagnostic error is not generated. The drive will automatically follow command values that lead back into the allowed range. Bit 2 of **P-0-0090, Travel limit parameter** is set to "Overtravelling is handled as a warning".

Cause:

The positive limit switch has been activated.

Remedy:

Enter command values that lead back into the allowed range.

See also the functional description: "Travel Zone Limit Switch Monitoring".

E844 Negative limit switch activated

The drive has received a command value which resulted in an axis position outside the negative travel range. The axis has been brought to a standstill by setting the velocity command to zero. A class 1 diagnostic error is not generated. The drive will automatically follow command values that lead back into the allowed range. Bit 2 of **P-0-0090, Travel limit parameter** is set to "Overtravelling is handled as a warning".

Cause:

The negative limit switch has been activated.

Remedy:

Enter command values which lead back into the allowed range.

See also the functional description: "Travel Zone Limit Switch Monitoring".

E881 Mains fault

Cause:

The mains voltage has failed for at least three mains cycles during operation.

Mains errors and undervoltage errors were set as fatal warnings in parameter **P-0-0118, Power off on error**.

The drive switches the motor off.

Remedy:

Checked the mains connections to ensure that they are as specified in the project planning manual.

See also the functional description: "Current Limit".

5 Description of Diagnostic Messages B…, C…, D… and A…

Command Diagnostic Messages B…, C… and D…

The commands are used for control of complex features in the drive. For example, the features "drive controlled homing procedure" or "Communication Phase 4 Transition Check" are defined as commands.

- Commands can start, interrupt or erase a primary control. A parameter belongs to each command whereby the command can be controlled by the parameter. During the command operation, the diagnostic message "Cx" appears in the display where the x stands for the number of the command.

Command Types

It can distinguish between 3 types of commands:

- **Drive Commands**
  - Lead to an eventual automatic drive movement
  - Can be started only through an inputted control enable
  - Deactivates the active operating mode during its operation
- **Monitor Commands**
  - Activation or deactivation of monitors or features
- **Management Commands**
  - Lead management tasks that are not interruptable

B100 Command Release motor holding brake

The command **P-0-0542, Command Release motor holding brake** has been activated.

See also the functional description: "Motor Holding Brake".

B101 Command not enabled

The command **P-0-0542, Command Release motor holding brake** has been activated without prior enabling via the parameter P-0-0538, Bit 9.

See also the functional description: "Motor Holding Brake".

B200 Brake check command

The command **P-0-0542, Command to open motor holding brake** was activated.

See also the functional description: "Motor Holding Brake"

B201 Brake check only with drive enable

P-0-0541, B200 command brake monitor was activated and the drive enable was not activated.

See also the functional description: "Motor Holding Brake"

B202 Error during abrasion of the brake

The brake monitor command tries to bed in the motor brake. This means that the motor must be moved with closed holding brake. If the torque of the motor is too small to move the motor with closed brake, then the command error is generated.

Cause:

1. Torque of amplifier has been reduced.
2. Axis is mechanically jammed.
3. Weight load plus brake torque is bigger than motor peak torque.

Remedy:

on 1: remove reduction

on 2: eliminate jam

on 3: reduce weight load

See also the functional description: "Motor Holding Brake"

B203 Brake torque too low

The motor moved when checking the brake torque during the command monitor brake. The motor holding brake thus does not supply the nominal torque.

Possible causes for the low holding torque:

1. Brake covered by oxidized layer due to storage
2. Brake covered by oil or lubricant
3. Brake is worn down.

Remedy on:

1. Re-start "command brake monitor".
2. Re-start "command brake monitor". The command brake monitor re-checks the brake torque again. If detected that the torque is too low, then the brake is bedded in. The bedding of the brake removes the oxidized layer or oil film. The brake should now be able to generate sufficient torque.
3. If multiple tries result in the brake still not reaching the holding torque, then the motor holding brake has to be replaced.

See also the functional description: "Motor Holding Brake"

C100 Communication phase 3 transition check

The command **S-0-0127, C1 Communication phase 3 transition check** has been activated.

See also the functional description: "S-0-0127, C100 Communication phase 3 transition check"

C101 Invalid communication parameter (S-0-0021)

Cause:

Communications parameters which are needed to operate the drive in communication phase 3 are invalid.

Remedy:

A list of the invalid parameters can be seen in parameter **S-0-0021, List of invalid op. data for comm. ph. 2**. The invalid parameters must be rewritten so they are correct.

See also the functional description: "S-0-0127, C100 Communication phase 3 transition check".

C102 Limit error communication parameter (S-0-0021)

Cause:

Communications parameters, which are needed to operate the drive in communication phase 3, are outside their limit values.

Remedy:

A list of the invalid parameters can be seen in parameter **S-0-0021, List of invalid op. data for comm. ph. 2**. The invalid parameters must be rewritten with values **between** the respective **min. and the max. value** to be correct.

See also the functional description: "S-0-0127, C100 Communication phase 3 transition check"

C104 Config. IDN for MDT not configurable

Cause:

Telegram type 7 was set in parameter **S-0-0015, Telegram type parameter**.

Parameters which are missing in **S-0-0188, List of configurable data in MDT** are kept in **S-0-0024**, **Configuration list for the master data telegram**.

Remedy:

- set preferred telegram (telegram type = 0..6)
- You must either set a priority telegram (Telegram type = 0..6) or provide **S-0-0024, Config. list of master data telegram** with parameters. These parameters are also contained in **S-0-0188, List of configurable data in the MDT**.

Note:	List parameters only allowed in multiplex channel.

See also the function description: "Configuration of Telegram Contents"

C105 Configurated length > max. length for MDT

Cause:

Telegram type 7 was set in parameter **S-0-0015, Telegram type parameter**.

The length of the configured data in MDT, which is determined by

S-0-0024, Configurations list of the master data telegram,

exceeds the maximum permissible length **S-0-0186, Length of the configurable data record in the MDT.**

Remedy:

- set preferred telegram (telegram type = 0..6)
- number of configured parameters in MDT (S-0-0024) must be decreased

See also the functional description: "Configuration of Telegram Contents"

C106 Config. IDN for AT not configurable

Cause:

Telegram type 7 was set in parameter **S-0-0015, Telegram type parameter**.

Parameters which are not contained in **S-0-0187, List of configurable data in AT** can be seen in

S-0-0016, Custom amplifier telegram configuration list.

Remedy:

- set preferred telegram (telegram type = 0..6)
- **S-0-0016, Configuration list of drive telegrams** mst have parameters that are also in **S-0-0187, List of configurable data in the AT**.

Note:	List parameters only allowed in multiplex channel.

See also the function description: "Configuration of Telegram Contents"

C107 Configurated length > max. length for AT

Cause:

Message frame type 7 has been selected in **S-0-0015, Telegram Type Parameter**. The length of the configured data record in the AT, that is defined via

S-0-0016, Custom amplifier telegram configuration list,

exceeds the value maximum permissible **S-0-0185, Length of the configurable data record in the AT**.

Remedy:

- set preferred telegram (telegram type = 0..6)
- number of configurated parameters in the AT (S-0-0016) must be decreased

See also the functional description: "Configuration of Telegram Contents"

C108 Time slot parameter > Sercos cycle time

Cause:

One of the time slot parameters:

- **S-0-0006, AT transmission starting time (T1)**
- **S-0-0007, Feedback acquisition starting time (T4)**
- **S-0-0008, Command valid time (T3)**
- **S-0-0089, MDT transmission starting time (T2)**

exceeds

S-0-0002, SERCOS Cycle time (Tscyc).

Remedy:

Correct the appropriate parameter(s). These times are determined by the manufacturer of the control system and are specified by the SERCOS interface.

See also the functional description: "Configuration of the Telegram Send and Receive Times"

C109 Position of data record in MDT (S-0-0009) even

Cause:

Parameter **S-0-0009, Beginning address in master data telegram** contains an even value. This is not permitted.

Remedy:

Parameter **S-0-0009, Beginning address in master data telegram** must be set to an odd value. These parameters are determined by the manufacturer of the control system, and are specified by the SERCOS interface.

See also the functional description: "Configuration of the Telegram Send and Receive Times"

C110 Length of MDT (S-0-0010) odd

Cause:

Parameter **S-0-0010, Length of master data telegram** contains an odd value. This is not permitted.

Remedy:

Parameter **S-0-0010, Length of master data telegram** must be set to an even value. These parameters are determined by the manufacturer of the control system, and are specified by the SERCOS interface.

See also the functional description: "Configuration of the Telegram Send and Receive Times"

C111 ID9 + Record length - 1 > length MDT (S-0-0010)

Cause:

Parameter(s) are set incorrectly for **S-0-0009, Beginning address in master data telegram** and **S-0-0010, Length of master data telegram**. The length of the record in MDT for the drive plus the starting address in MDT is greater than the total length of the MDT.

Remedy:

The parameters for **S-0-0009, Beginning address in master data telegram** and **S-0-0010, Length of master data telegram** must be corrected. Those parameters are determined by the manufacturer of the control system and are specified by the SERCOS interface.

See also the functional description: "Configuration of the Telegram Send and Receive Times"

C112 TNcyc (S-0-0001) or TScyc (S-0-0002) error

Cause:

Only multiples of 1ms are permitted as valid values for **S-0-0001, NC Cycle time (TNcyc)** and **S-0-0002, SERCOS Cycle time (Tscyc)**. Here, this is not the case.

Remedy:

S-0-0001, NC Cycle time (TNcyc) and **S-0-0002, SERCOS Cycle time (Tscyc)** must be corrected. These parameters are determined by the manufacturer of the control system and are specified by the SERCOS interface.

See also the functional description: "Configuration of the Telegram Send and Receive Times"

C113 Relation TNcyc (S-0-0001) to TScyc (S-0-0002) error

Cause:

The value of **S-0-0001, NC Cycle time (TNcyc)** can only be equal to or be a multiple of **S-0-0002, SERCOS Cycle time (Tscyc)**. Here this is not the case.

Remedy:

S-0-0001, NC Cycle time (Tncyc) and **S-0-0002, SERCOS Cycle time (Tscyc)** must be corrected. These parameters are determined by the manufacturer of the control system and are specified by the SERCOS interface.

See also the functional description: "Configuration of the Telegram Send and Receive Times"

C114 T4 > TScyc (S-0-0002) - T4min (S-0-0005)

Cause:

The maximum permissible value for **S-0-0007, Feedback acquisition starting time (T4)** is

S-0-0002, SERCOS Cycle time (Tscyc) -
S-0-0005, Minimum feedback acquisition time(T4min)

The value for **S-0-0007, Feedback acquisition starting time (T4)** is incorrect.

Remedy:

Correct S-0-0007, Feedback acquisition starting time (T4). These parameters are determined by the manufacturer of the control system and are specified by the SERCOS interface.

See also the functional description: "Configuration of the Telegram Send and Receive Times"

C115 T2 too small

Cause:

The value set for **S-0-0089, MDT Transmit starting time (T2)** is incorrect. The drive cannot work with this value.

Remedy:

Correct S-0-0089, MDT Transmit starting time (T2).

These parameters are determined by the manufacturer of the control system, and are specified by the SERCOS interface.

See also the functional description: "Configuration of the Telegram Send and Receive Times"

C118 Order of MDT configuration wrong

The chronological order of processing the cyclical MDT data in the drive is the same order in which the configurated ident numbers (IDN) are placed in the parameter **S-0-0024, Config. list of the master-data-telegram**. For the usage of the multiplex mode in the MDT, there are the parameters

- **S-0-0360, MDT Data container A**
- **S-0-0368, Addressing for data container A**
- **S-0-0362, List index, MDT data container A**

If more than one of these parameters is configured in the MDT, their correct order is checked in the command **S-0-0127, C100 Communication phase 3 transition check**. The following rules must be obeyed:

- **S-0-0368, Addressing for data container A** must be configured as the first of the 3 parameters above.
- **S-0-0360, MDT Data container A** must be configured as the last of the 3 parameters above.

If this is not the case, the drive generates the command error **C118 Order of MDT configuration wrong**.

C200 Communication phase 4 transition check

Meaning:

The command **S-0-0128, C200 Communication phase 4 transition check** has been activated.

See also the functional description "S-0-0128, C200 Communication phase 4 transition check".

C201 Invalid parameter(s) (->S-0-0022)

Cause:

Parameters which will be necessary to operate the drive in communications phase 4 are invalid. The invalid parameters can be seen in **S-0-0022, IDN list of invalid op. data for comm. ph. 3**.

Remedy:

The parameters of **S-0-0022, IDN list of invalid op. data for comm. ph. 3** must be rewritten so they are correct.

See also the functional description "S-0-0128, C200 Communication phase 4 transition check".

C202 Parameter limit error (->S-0-0022)

Cause:

Parameters which are necessary to operate the drive in communications phase 4 are outside of their minimum or maximum input values, or the entered value can’t be processed (for bit bars). The incorrect parameters are listed in **S-0-0022, IDN list of invalid op. data for comm. ph. 3**.

Remedy:

The parameters of **S-0-0022, IDN list of invalid op. data for comm. ph. 3** must be rewritten with correct values.

See also the functional description "S-0-0128, C200 Communication phase 4 transition check".

C203 Parameter calculation error (->S-0-0022)

Cause:

Parameters that are required for phase-4 operation (operating mode) cannot be processed in that way. The incorrect parameters are listed in **S-0-0022, IDN List of Invalid Op. Data for Comm. Ph. 3**.

Remedy:

Write correct values to the parameters in **S-0-0022, IDN List of Invalid Op. Data for Comm. Ph. 3**.

See also the functional description "S-0-0128, C200 Communication phase 4 transition check".

C204 Motor type P-0-4014 incorrect

An MHD-, MKD or MKE motor (value 1 or 5) is entered into parameter **P-0-4014, Motor type**. The appropriate abbreviation "MHD", "MKD", or "MKE" however, was not found in parameter **S-7-0141, Motor type** in the motor feedback data memory.

Cause:

1. Incorrect parameter set for type of motor.
2. The motor feedback memory cannot be read.
3. motor feedback - not connected

Remedy for:

1. Enter the type of motor used in parameter **P-0-4014, Motor type**
2. Check feedback connection. If feedback is defective, exchange motor.

See also the functional description: "Automatic Setting of the Motor Type for Motors with Feedback Memory".

C211 Invalid feedback data (->S-0-0022)

Invalid data has been encountered when the parameters stored in the motor feedback were read, or an error has occurred when the data was read.

Causes:

1. Motor feedback cable not connected or defective
2. Motor feedback defective
3. Drive controller defective

Remedy for:

1. Check motor feedback cable; connect both sides
2. Replace motor
3. Replace amplifier

See also the functional description "S-0-0128, C200 Communication phase 4 transition check".

C212 Invalid amplifier data (->S-0-0022)

During drive initialization, the operating software accesses data from an EEPROM in the drive controller. This error message is generated if the attempt to read the data has failed.

Causes:

Defective hardware in the drive controller.

Remedy:

Replace drive controller.

See also the functional description "S-0-0128, C200 Communication phase 4 transition check".

C213 Position data scaling error

Cause:

The scaling parameters for position data permit the position data display format to be selected. The drive-internal position data format depends on the employed motor encoder and the encoder resolution. The factor used for converting the position data from the drive-internal format into the display format or vice versa is outside the allowable range, because either

- linear motor and rotary position scaling with motor reference, or
- rotary motor and linear position scaling with motor reference, or
- linear motor with modulo scaling has been selected; or
- the determined factor used for converting the position data from the display format to the internal format, and vice versa, cannot be represented.

Remedy:

Checking and correcting the relevant parameters, such as

- **S-0-0076, Position data scaling type**
- **S-0-0077, Linear position data scaling factor**
- **S-0-0078, Linear position data scaling exponent**
- **S-0-0079, Rotational position resolution**
- **S-0-0116, Resolution of motor feedback**
- **S-0-0121, Input revolutions of load gear**
- **S-0-0122, Output revolutions of load gear**
- **S-0-0123, Feed constant**
- **P-0-0074, Interface feedback 1**
- **S-0-0277, Position feedback 1 type parameter**

See also the functional description "S-0-0128, C200 Communication phase 4 transition check".

C214 Velocity data scaling error

Cause:

The scaling parameters for velocity data permit the velocity data display format to be selected. The drive-internal velocity data format depends on the employed motor encoder and the encoder resolution. The factor used for converting the velocity data from the drive-internal format into the display format or vice versa is outside the allowable range.

Remedy:

Checking and correcting the relevant parameters, such as

- **S-0-0044, Velocity data scaling type**
- **S-0-0045, Velocity data scaling factor**
- **S-0-0046, Velocity data scaling exponent**
- **S-0-0116, Resolution of motor feedback**
- **S-0-0121, Input revolutions of load gear**
- **S-0-0122, Output revolutions of load gear**
- **S-0-0123, Feed constant**
- **P-0-0074, Interface feedback 1**
- **S-0-0277, Position feedback 1 type parameter**

See also the functional description "S-0-0128, C200 Communication phase 4 transition check".

C215 Acceleration data scaling error

Cause:

The display format of the acceleration data can be set using acceleration scaling parameters. The drive-controlled format of the acceleration data is dependent on what motor encoder and encoder resolution are used. The factor for converting acceleration data from internal drive format to display format (or vice-versa) is outside the allowable range.

Remedy:

Check and set the relevant parameters correctly as follows:

- **S-0-0160, Acceleration data scaling type**
- **S-0-0161, Acceleration data scaling factor**
- **S-0-0162, Acceleration data scaling exponent**
- **S-0-0116, Resolution of motor feedback**
- **S-0-0121, Input revolutions of load gear**
- **S-0-0122, Output revolutions of load gear**
- **S-0-0123, Feed constant**
- **P-0-0074, Interface feedback 1**
- **S-0-0277, Position feedback 1 type parameter**

See also the functional description "S-0-0128, C200 Communication phase 4 transition check".

C216 Torque/force data scaling error

Cause:

The display format of the torque/force data can be set using torque/force scaling parameters. The factor for converting torque data from drive-controlled format to display format (or vice-versa) is outside the allowable area.

Remedy:

Check and set the relevant parameters correctly as follows:

- **S-0-0086, Torque/force data scaling type**
- **S-0-0093, Torque/force data scaling factor**
- **S-0-0094, Torque/force data scaling exponent**
- **S-0-0110, Amplifier peak current**
- **S-0-0111, Motor current at standstill**

See also the functional description "S-0-0128, C200 Communication phase 4 transition check".

C217 Feedback1 data reading error

All MKD und MHD motors have a data memory in the feedback unit. From there, settings for the encoder are read.

Cause:

During reading of the values from the feedback, an error has occurred.

Remedy:

Check feedback cable.

Change motor.

See also the functional description "S-0-0128, C200 Communication phase 4 transition check".

C220 Feedback 1 initializing error

A number of tests are performed when the motor encoder is initialized. An error was detected during this process. This error may be:

- Error while reading the angle rectification data
- Error while copying the angle rectification data
- Interruption of communication with the encoder
- Assembly error with the position of an initialization track
- Error while reading the analog signal of an initialization track
- Error in the pointer length of the analog signal of an initialization track
- Invalid offset between the high and low resolution track
- Error in the measuring system micro-controller

Cause:

1. Defective motor feedback cable
2. Defective motor feedback
3. Defective measurement system interface

Remedy for:

1. Check the motor feedback cable.
2. Exchange the motor.
3. Exchange the measuring system interface, if it is a module, or the complete drive controller.

See also the functional description "S-0-0128, C200 Communication phase 4 transition check".

C223 Input value for max. range too high

Cause:

An internal position resolution has been selected via the **S-0-0278, Maximum travel range** parameter that no longer guarantees a correct commutation of the motor.

Remedy:

Select a smaller value for the **S-0-0278, Maximum travel range** parameter.

See also the functional description "S-0-0128, C200 Communication phase 4 transition check".

C227 Modulo range error

Cause:

The marginal conditions for modulo processing were not maintained.

See functional description: "Modulo Processing-Limiting Conditions".

C228 Controller type S-0-0140 wrong

During the **S-0-0128, C200 Communication phase 4 transition check** command the data for the heat sink temperature model stored in the non-volatile memory of the amplifier are checked for validity. If an error is detected during this check the drive reacts with the **C228 Controller type S-0-0140 wrong** error message.

Cause:

Amplifier EEProm defective.

Remedy:

Replace/repair controller.

See also Parameter Description "S-0-0128, C200 Communication phase 4 transition check"

C234 Encoder combination not possible

Cause:

The encoder interface that has been selected in the **P-0-0075, Interface Feedback 2, optional** parameter cannot be supported by the drive; it has already been allocated to the motor encoder.

Remedy:

Select another optional encoder.

See also the functional description: "Determining the Encoder Interface of the Optional Encoder"

C236 Feedback 1 required (P-0-0074)

Cause:

A motor encoder is not required (P-0-0074 = 0) if a load-sided motor encoder has been selected via the **P-0-0185, Function of opt. encoder** parameter. However, **S-0-0147, Homing parameter** or the **S-0-0032...35, Mode of Operation** parameters contain values that require a motor encoder.

Remedy:

Change **S-0-0147, Homing parameter** or the **S-0-0032...35, Mode of Operation** parameters such that they are suitable for using an optional encoder.

Enter a value ≠ 0 in the **P-0-0074, Interface feedback 1** parameter to activate the motor encoder.

See also the functional description "S-0-0128, C200 Communication phase 4 transition check".

C243 Motor-amplifier combination invalid

For each drive of the ECODRIVE Cs series there is only one possible controller-motor combination, i.e. only the motor adjusted to the controller can be operated.

Cause:

1. motor type does not match the controller
2. controller does not match the motor type

Remedy for:

1. replace the motor type
2. replace the controller

C300 Command Set absolute measuring

Command **P-0-0012, C300 Command 'Set absolute measurement'** was activated by the control system in use.

See also the functional description: "Set Absolute Measuring"

C302 Absolute measuring system not installed

Command **P-0-0012, C300 Command 'Set absolute measurement'** was started without an absolute measuring system being present.

The command cannot be processed because no absolute measuring system is available.

Cause:

1. The command should not have been activated.
2. The contacted motor or the external measurement system was not executed as an absolute encoder.

Remedy for:

1. Stop execution of the command.
2. Equip the motor or external measurement system with an absolute encoder function.

See also the functional description: "Set Absolute Measuring"

C400 Switching to parameter mode

The command for transition into parameter mode. Before editing parameters that can be edited only in parameter mode, this command must be processed.

See also the functional description: "Parametrization Mode - Operating Mode"

C401 Drive active, switching not allowed

Cause:

The command **C400 Command: Switch to parameter mode** has been started, although the drive enable is on.

Remedy:

End the command and turn off the drive enable, then the command can be started again.

See also the functional description: "Parametrization Mode - Operating Mode"

C402 Only allowed without master

Cause:

The command **P-0-4023, C400 Communication phase 2 transition** was started even though the command communications interface (SERCOS or fieldbus) is active (P-0-4086 = 00b). The command can only be executed if the command communications interface (SERCOS or fieldbus) is **inactive** (P-0-4086 = xx1b). The command communications interface is active if signals are pending at the SERCOS interface Signal receiver

Remedy:

Phase progression via SERCOS interface must be executed or SERCOS interface deactivated prior to command start.

C500 Reset class 1 diagnostic, error reset

The command for clearing errors, **S-0-0099, C500 Reset class 1 diagnostic** was activated by the control system in use. All drive internal errors are cleared. But before that happens, the cause of the error must have been cleared.

See also the functional description: "Clearing Errors"

C600 Drive controlled homing procedure command

Command **S-0-0148, C600 Drive controlled homing procedure command** has been activated by the control system in use.

see also the functional description: "Drive-Controlled Homing"

C601 Homing only possible with drive enable

Cause:

The controller enabling signal was not active when the program was started. This is not permitted.

Remedy:

1. Switch on the controller enable signal.
2. Start the command again.

See also the functional description: Functions of the Control During "Drive-Controlled Homing""

C602 Distance home switch - reference mark erroneous

Cause:

The evaluation of the homing switch has been activated. The distance between the positive homing switch edge and the reference mark that shall be interpreted is outside the valid range.

Remedy:

Read the value from the **S-0-0298, Reference cam shift by ...** parameter and enter it in the **S-0-0299, Home switch offset** parameter.

See also the functional description: "Connection of the Home switch"

C604 Homing of absolute encoder not possible

Cause:

If, with absolute encoder, the homing command was called without having done the command **P-0-0012, Set absolute measuring** before, the homing command is cancelled with this error.

If the encoder had been referenced with the "**Set absolute measuring**“, then the homing command would give you a possibility to trigger a positioning move to the reference point.

Remedy:

Home the absolute encoder with the command "**Set absolute measuring**“.

See also the functional description: "Possible Error Messages During "Drive-Controlled Homing""

C606 Reference mark not detected

Cause:

If a distance-coded or an incremental measuring system with zero switch are referenced, then the maximum travel distance during the referencing procedure is known. If no reference mark is detected over the course of this path, then error message **C606, Reference mark not detected** is generated and referencing is aborted with the generation of an error.

Note: The traversing path of linear non-distance coded measuring system with zero switch evaluation is not known if „0“ is entered in parameter **P-0-0153, Optimal distance home switch - reference mark.** This is generally the case if the linear scale has no reference marks at equal and known distances.

Remedy:

- Check the measuring system to be referenced as well as all cabling.
- Check for correct parametrization.
- Check the correction reference mark detection using command **P-0-0014, D500 Command determine marker position**

C700 Basic load

With motors of the MHD, MKD and MKE series, the controller parameters for the connected motor that are stored in the controller are set to their default values by activating the controller parameters that are stored in the motor feedback. The drive controller issues the C7 message to indicate that the **C700 Basic load** command has been activated via the command parameter **S-0-0262, C700 Command basic load**.

Cause:

The command **C700 Basic load** has been activated.

See also the functional description "Load Default"

C702 Default parameters not available

With motors of the MHD, MKD and MKE series, adapting the control loops to the connected digital drive is done by activating the speed controller parameters that are stored in the motor feedback. The drive controller employs the **C702 Default parameters not available** message to signal that the **S-0-0262, C700 Command basic load** command has been activated, but that there is no data memory at the connected motor.

Remedy:

Order the parameter sheet of the employed motor from the INDRAMAT Service, and enter the parameters.

see also the functional description: "Error Conditions of the Load Default Settings Procedure"

C703 Default parameters invalid

Cause:

The default parameters are read from the motor feedback data memory. At least one of these parameters is invalid.

Remedy:

Check the connection to the motor feedback. Exchange the motor if necessary.

See also the functional description: "Error Conditions of the Load Default Settings Procedure"

C704 Parameters not copyable

Cause:

The default parameters in use are not compatible with this software version.

Remedy:

Please contact Rexroth Indramat. Explain, which software version, which device and which motor type you have.

See also the functional description: "Error Conditions of the Load Default Settings Procedure"

C800 Default parameter load

How to start the command:

This command can be started in 2 ways:

1. When "PL" is displayed on the drive controller (appears after a change in firmware version), by pressing the S1 button beneath the display.
2. By starting the **P-0-4094, C8 Default parameter load**

What the command does:

All the **parameters are** cleared and preset with their default (initial) value. Process blocks and control loop settings are **overwritten**, too.

Default parameters:

Default values are stored in the drive for all parameters which are listed in **S-0-0192, IDN-list of backup operation data**. They define a **basic state** of the drive that permits the drive to be switched "ready for operation" (display "bb“). Mechanical components like gear and load as well as the control loop settings therefore are not taken into consideration.

see also the functional description: "Basic parameter block".

C801 Parameter default value erroneous (-> S-0-0021)

Cause:

During the execution of **P-0-4094, C800 Command Base-parameter load,** a default value that has been stored in the drive was recognized as incorrect. The related parameter is entered in the **S-0-0021, IDN-list of invalid op. data for comm. Ph. 2**.

See also the functional description: "Basic parameter block"

C802 Locked with password

The parameter **S-0-0267, Password** offers the possibility to set a **write protection** for the drive parameters. The diagnostic message **C705 Locked with password** indicates, that the command **P-0-4094, C800 Command Base-parameter load** has been started, although the drive parameters are protected with the customer password.

See also the functional description: "Basic parameter block"

D300 Command adjust commutation

A correctly adjusted commutation offset is mandatory for the operation of synchronous motors. The "D3“ message indicates that the command has been activated, that is used for determining the commutation offset.

Cause:

The commutation setting command has been activated.

See also the functional description: "Determining commutation offset"

D301 Drive not ready for commutation command

Meaning:

The drive must be in torque control mode when the "D3“ command is started.

Cause:

Activate torque control and start the command again.

See also the functional description: "Determining commutation offset"

D302 Torque/Force too small to move

The command **D3 Command adjust commutation** has been started. To perform this, the motor must move. But it doesn’t move.

Cause:

1. The torque is too small to overcome mechanical resistances (friction or weight).
2. The motor is blocked mechanically.
3. Motor movement and encoder rotation direction are contradictory to each other.

Remedy:

1. Increase the **S-0-0092, Torque/Force limit** bipolar so that the motor overcomes the mechanical resistances and can turn. Check also P-0-0109, Torque/Force peak limit; this parameter value should be at least as great as S-0-0092.
2. Clear the jamming. Check also the brake.
3. At the motor connection, switch 2 phases or turn rotational direction of encoder (Parameter S-0-0277, position encoder type parameter 1).

Note: **For devices with analog inputs, the torque can be limited via an** analog torque reduction**.**

See also the functional description: "Determining the commutation offset"

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D303 Drive in control at start of command

If the drive controller is in control, then it is not possible to execute command **P-0-0524, D300 Commutation adjustment command**.

D304 Error in offset calculation

The commutation offset could not be correctly determined because the values were wrong.

D305 Drive enable refused

At the command **P-0-0524, D300 Commutation adjustment command** the drive itself applies the drive enable. This procedure failed.

D306 Power is off

If the power is off, then it is not possible to execute command **P-0-0524, D300 Commutation adjustment command**.

D307 Drive does not move

Command **P-0-0524, D300 Commutation adjustment command** was terminated with an error.

D308 No adjustment with asynchronous motor

Commutation offset determination is not possible with an asynchronous motor.

D309 Proceed to phase 4

If the drive controller is not in phase 4 (bb), then it is not possible to executed command **P-0-0524, D300 Commutation adjustment command**.

D310 Input master password

No master password was input.

D311 Commutation offset could not be determined.

The automatic commutation adjustment has tried to determine the commutation offset. This has failed.

Cause:

1. The motor could not move freely.
2. Direction of movement of the encoder is incorrect.
3. Incorrect polarity of the motor.
4. Axis mechanically blocked.
5. Brake applied.
6. Axis is in endstop position.

Remedy for:

1. Check mechanically whether the motor can be moved.
2. Check the encoder. Invert the direction of movement of the encoder, if necessary.
3. Check motor connection to the controller.
4. Release mechanical blocking.
5. Check brake and control signals. The brake must be released immediately when the controller enable signal is set.
6. Make sure the axis does not remain in endstop position.

See also functional description: "Determining the commutation offset"

D312 Motion range exceeded during commutation

A range of +/- 1 pole pair distance is defined, within which the axis may move during the Automatic Commutation adjustment. If this range is exceeded, this error message appears.

Cause:

1. The drive enable has been set while the axis was still in motion.
2. The axis has been moved by a mechanical force.
3. Parameters P-0-0560 Commutation adjustment current and P-0-0562 Commutation adjustment cycle time are set too high. Possibly the mechanical properties of the axis, like friction or weight load, have changed.

Remedy:

1. Wait until the axis stands still and set the drive enable once again.
2. Inhibit the influence of the mechanical force.
3. Reduce the parameter values for P-0-0560 Commutation adjustment current and P-0-0562 Commutation adjustment cycle time. You can also set them to the default values P-0-0560 Commutation adjustment current = 25 % and P-0-0562 Commutation adjustment cycle time = 4 milliseconds. Afterwards, start the command D300 commutation adjustment to evaluate once again the optimal parameters.

See also the functional description: "Asynchronous Motors".

D400 Positive stop drive procedure command

When the positive stop drive procedure command is activated, all controller monitoring which would result in an error message for class 1 diagnostic caused by blocking the drive with a positive stop is turned off.

Cause:

Command **D400 Positive stop drive procedure command** was activated.

See also the functional description: "Positive stop drive procedure"

D401 ZKL1-Error at command start

Cause:

A class 1 diagnostic error was discovered while starting the command "Positive stop drive procedure" As a result, the command could not be executed.

Remedy:

Eliminate the cause of the error, clear the error, and start the command again.

See also the functional description: "Positive stop drive procedure"

D500 Command Get mark position

The **P-0-0014, D500 Command determine marker position** command can be used for checking the correct acquisition and position of the reference marker of an incremental measuring system. The "d5“ display shows that the command has been activated.

Cause:

The **Determine marker position** command has been activated.

See also the functional description: "Functional principle of command detect marker position"

D501 Incremental encoder required

Cause:

The command has been started for a measuring system that does not possess real reference markers. These include measuring systems such as DSF, EnDat, SSI or resolver measuring systems.

Remedy:

Check whether the correct encoder has been selected in **S-0-0147, Homing parameter**.

Employ an encoder system with real reference markers.

See also the functional description: "Functional principle of command detect marker position"

D600 Cancel reference point procedure command

Meaning:

The reference of the encoder that has been selected via **S-0-0147, Homing parameter** is canceled.

Cause:

The **D600 Cancel reference point procedure command** has been activated.

See also the functional description: "Drive-Controlled Homing"

D700 Parking axis command

The command permits one or more drives of a drive package to be stopped without error messages being issued to the controller and/or the power supply module. The remaining drives of the package can be handled without any restrictions.

Cause:

The **S-0-0139, D700 Command parking axis** command has been activated.

See also the functional description: "Command Parking Axis"

D701 Parking axis only while drive is disabled

The start of command "Command Parking Axis" is only permitted without drive enable applied.

If the command is activated with an applied drive enable, then the drive generates command error **D701 Parking axis only while drive is disabled**.

See also the functional description: "Command Parking Axis"

D900 Command automatic loop tuning

Description:

The start of this command means that an automatic control loop setting is executed in the drive if the drive is in the loop at command start, i.e., the drive enable signal is applied.

WARNING

The start of this command can trigger a movement if drive enable and drive start are at the drive.

The drive conducts autonomous movements within the range defined by both limits.

The E-stop sequence function and the travel range limit switch must be guaranteed and checked.

See also Function description:
"Safety Instructions"

During command D9, the drive autonomously conducts motions, i.e., without external command value.

See also Function description "Automatic Control Loop Settings"

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D901 Start requires drive enable

Description:

To ensure that the drive is in the loop when starting the command **P-0-0162, D9 automatic control loop setting,** such is queried at command start.

Cause:

Drive enable not set at command start (NO-RF)

Remedy:

Set drive enable and restart command.

See also the functional description: "Automatic Control Loop Settings"

D902 Motor feedback data not valid

Description:

At the start of the automatic control loop setting (**P-0-0162),** the motor parameters

- torque constant
- rated current of unit are read out of the feedback.

Cause:

- One of the above feedback data has a value smaller than or equal to zero (<=0). This means that the controller parameter is incorrectly calculated.
- Motor without feedback data storage.

Remedy:

If known, write the correct values back into the parameter or contact Indramat Customer Service to obtain the feedback data valid for your motor.

In the worst case, it may be necessary to replace the motor.

See also the functional description:"Automatic Control Loop Settings"

D903 Inertia detection failed

At the start of the automatic control loop setting, the load moment of inertia is determined with an "oscillation attempt".

This means that the speed change and the motor current must exceed a minimum value during acceleration or deceleration to guarantee a sensible and sufficiently precise calculation of the moment of inertia.

Cause:

- drive acceleration too low
- number of measured value too small for automatic control loop setting
- motor speed too low
- load moment of inertia too big

Remedy:

- increase bipolar torque/force value **S-0-0092**
- increase pos. accel S-0-0260
- increase pos. speed S-0-0259
- increase feedrate override S-0-0108

See also Function description: "Prerequisites for Starting Automatic Control Loop Settings"

D904 Gain adjustment failed

In exceptional cases, difficulties in the automatic control loop setting may arise. This means that an automatic setting is not possible. Standard or default values must therefore be loaded into the drive.

Cause:

- oscillating mechanical systems (resonance)
- high level of interference in the encoder signal

Remedy:

Satisfactory results can sometimes be achieved by starting the command **P-0-0162, D9 automatic control loop setting** with a large **P-0-0163, damping factor for automatic control loop setting**, i.e., low dynamics.

This value can be reduced until the control loop behaves as needed.

If even then control loop settings remain unsuccessful, then the setting must be manual.

See also the functional description:"Automatic Control Loop Settings"

D905 Travel range invalid, P-0-0166 & P-0-0167

Before starting an automatic control loop setting, both travel range limits, i.e., upper and lower, must be defined.

When starting command **P-0-0162, D9 automatic control loop setting** the number values are automatically checked for validity. It is checked if the traversing path is large enough and if sensible values have been entered.

Cause:

- **P-0-0167, upper traversing range** smaller than **P-0-0166, lower traversing range**
- Maximum traversing path (**P-0-0169, Travel distance for autom. control loop adjust**) is less than 6 motor rotations and thus too small to start the automatic control loop setting.

Remedy:

- clear command error by ending the command
- a) input new limits whereby:upper > lower limits
  b) redefine limits to define a larger traversing range
- restart command with sensible traversing range

See also Function description: "Prerequisites for Starting Automatic Control Loop Settings"

D906 Travel range exceeded

Description:

During automatic control loop setting, there is a constant monitoring of the valid traversing range **P-0-0166** and **P-0-0167**.

If only one of these limits is exceeded, then command error **D906** is generated and the drive brought to standstill speed controlled.

Possible causes:

- actual position outside of defined traversing range
- limits redefined after command start

Remedy:

- clear command error and end command
- redefine limits so that the actual position is within defined traversing range
- restart command using sensible traversing range

See also Function description: "Prerequisites for Starting Automatic Control Loop Settings"

5.1 Status Diagnostic Messages A…

A000 Communication phase 0

The communication process is divided into four communication phases: Phases 0 and 1 are used to recognize the participants. Phase 2 is used to prepare the time and data protocols for communication phases 3 and 4.

Initialization is performed in ascending order of the sequence. The defaults of the communication phase are set by the control system. When the switch to communication phase 4 takes place, initialization is completed and input power is enabled.

If the phase switch is interrupted, the status display remains in the communications phase which has already been reached.

If diagnostic message **A000 Communication phase 0** is active, the drive is in phase 0 and is waiting for a phase transfer to 1 by the control system.

See also the functional description: "Parametrization Mode - Operating Mode".

A001 Communication phase 1

The communication process is divided into four communication phases: Phases 0 and 1 are used to recognize the participants. Phase 2 is used to prepare the time and data protocols for communication phases 3 and 4.

Initialization is performed in ascending order of the sequence. The defaults of the communications phase are set by the control system. When the switch to communications phase 4 takes place, initialization is completed and input power is enabled.

If the delayed phase switch is interrupted, the status display remains in the communications phase which has already been reached.

If diagnostic message **A001 Communication phase 1** is active, the drive is in phase 1, and transfer from phase 1 to 2 has not yet been initiated by the control system.

See also the functional description: "Parametrization Mode - Operating Mode".

A002 Communication phase 2

For field bus and SERCOS devices, the control demands via the master communication "communication phase 2", or the drive has been switched to phase 2 by the command **P-0-4023, C400 Communication phase 2 transition**. Therefore, the drive is in the "parameter mode". In this mode, many parameters are editable, which can no more be edited in "communication phase 4" ("operation mode").

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In this phase, usually

- for field bus and SERCOS devices, the communication parameters are transferred from the control to the drive and
- the functions Load and Save parameters ("file services“) are performed when needed.

Before switching to communication phase 3 is possible, the command **S-0-0127, C100 Communication phase 3 transition check** must be done. In this command, the drive checks e.g. the validity of the parameters needed for the communication phase 3.

After successful execution of the command, the control switches the drive to comm. phase 3 (with field bus and SERCOS devices), or the drive switches by itself to phase 3 at the end of the command.

See also the functional description: "Parametrization Mode - Operating Mode".

A003 Communication phase 3

For field bus and SERCOS devices, the control demands via the master communication "communication phase 3", or the drive has been switched to phase 3 by the command **S-0-0127, C100 Communication phase 3 transition check**. The drive is in the "restricted parameter mode". In this mode, still many parameters are editable too, which can no more be edited in "communication phase 4" ("operation mode").

Before switching to communication phase 4 is possible, the command **S-0-0128, C200 Communication phase 4 transition check** must be done. In this command, the drive checks e.g. the validity of the parameters needed for the communication phase 4 ("operation mode").

After successful execution of the command, the control switches the drive to comm. phase 4 (with field bus and SERCOS devices), or the drive switches by itself to phase 4 at the end of the command.

See also the functional description: "Parametrization Mode - Operating Mode".

A009 Automatic baud rate detection for SERCOS Interface

The communication build-up is divided into four communication phases: Phases 0 and 1 are used to recognize the nodes. In phase 2 the time and data build-up of the protocols are prepared for the communication phases 3 and 4.

Initialization is carried out in ascending order. The input of the communication phase is given by the control unit. Switching to communication phase 4 completes the initialization and allows power input.

If the phase progression is interrupted, the status display remains in the communication phase that has been reached.

If the diagnosis **A009 Automatic baud rate detection for SERCOS Interface** is active, the drive is in phase 0 – 1, the progression to phase 0 is carried out at the moment when the correct baud rate is detected.

See also functional description: "Parameterization mode – operating mode"

A010 Drive HALT

The feature Drive-Halt (= contrary of Drive-Start) is activated by the applied control via the used interface through clearing the /Drive-Halt bit (bit 13) in the master control word or by interrupting a drive control command (i.e. drive-controlled homing).

The Drive-Halt feature is for decelerating the axis to standstill at defined **acceleration and** defined **jerk**.

In **Jog mode S-0-0260**, **Positioning Acceleration** is used for **acceleration** and **S-0-0193**, **Positioning Jerk** is used.

In **Velocity control** and in Torque control mode, the drive is decelerated to standstill by setting the velocity command to 0 and using the max. torque.

See also the functional description: "The Functional Principle of Drive Halt".

A012 Control and power sections ready for operation

The drive is supplied with **control voltage**, and the power is **switched on**. The drive is **ready** to deliver **power.**

A013 Ready for power on

The drive is supplied with a **control voltage**, and there are **no errors** in the drive controller.

The drive is **ready** to be turned **on with power**.

See also the functional description: "Parametrization Mode - Operating Mode".

A100 Drive in TORQUE control

The drive is in the torque control operating mode. It follows the torque command value sequence set by the control system.

See also the functional description: "Operating Mode: Torque Control".

A101 Drive in VELOCITY control

The drive is in the velocity control operating mode. It follows the velocity command value sequence set by the control system. The velocity control loop is closed in the drive.

See also the functional description: "Operating Mode: Velocity Control".

A102 Position mode with encoder 1

The drive is in **position control mode**. The position loop is closed in the drive by a position encoder. The control system only sets the position command value sequence; the drive follows the command value with a systematical **lag** (following error).

Encoder 1 indicates that the position encoder is installed on the motor shaft (indirect measurement of the axis position).

See also the functional description: "Operating Mode: Position Control".

A104 Position mode lagless, encoder 1

The drive is in **position control mode**. The position loop is closed in the drive by a position encoder. The control system only sets the position command value sequence; the drive follows the command value **without following error** (lagless)

Encoder 1 indicates that the position encoder is installed on the motor shaft (indirect measurement of axis position).

See also the functional description: "Operating Mode: Position Control".

A106 Drive controlled interpolation, encoder 1

The drive receives a position command value from the control system which is identical to the **target position** of the travel path. Then the drive generates (**interpolates**) an internal position command value sequence, which uses the control system to maintain maximum values for jerk, velocity and acceleration sequences.

The drive moves with a systematical lag (following error) to the target position.

Encoder 1 indicates that the position encoder is installed on the motor shaft (indirect measurement of the axis position).

See also the functional description: "Operating Mode: Drive Internal Interpolation".

A108 Drive controlled interpolation, lagless, encoder 1

The drive receives a position command value from the control system which is identical to the target position of the travel path. Then the drive generates (interpolates) an internal position command value sequence, which uses the control system to maintain maximum values for jerk, velocity and acceleration sequences.

The drive moves without following error (lagless) to the target position.

Encoder 1 indicates that the position encoder is installed on the motor shaft (indirect measurement of the axis position).

See also the functional description: "Operating Mode: Drive Internal Interpolation".

A110 Velocity synchronization, virtual master drive

The drive is in **velocity control.** The command velocity is determined in the drive taking the ratio as well as master axis position into account.

Virtual master axis means that the master axis position is computed by the control.

See also the functional description: "Operating mode: Velocity synchronization with virtual master axis"

A112 Phase synchronization, encoder 1, virtual master drive

The drive is in **position control.** The position control loop is closed in the drive via a position encoder. The position command value is fixed in the drive taking ratio and master axis position into account. The drive follows the command value **with lag distance**. **Encoder 1** means that the position encoder is mounted on the motor shaft (indirect measurement of axis position). **Virtual master axis** means that the master axis position is fixed by the control.

See also the functional description: "Operating mode: Phase synchronization with virtual master axis"

A116 Phase synchr. lagless, encoder 1, virtual master drive

The drive is in **position control.** The position control loop is closed in the drive via a position encoder. The position command value is fixed in the drive taking ratio and master axis position into account. The drive follows the command value with lag distance. Encoder 1 means that the position encoder is mounted on the motor shaft (indirect measurement of axis position). Virtual master axis means that the master axis position is fixed by the control.

See also the functional description: "Operating mode: Phase synchronization with virtual master axis"

A128 Cam shaft, encoder 1, virtual master drive

The drive is **cam mode**. The function is derived from the mechanical cam principle. This includes a fixed position relationship between master and slave axes. The position command values are listed in the table and can be accessed using the master axis position. The drive complies with the command value with lag distance. Encoder 1 means that the position encoder is mounted to the motor shaft (indirect measurement of axis position).

Virtual master axis means that the master axis position is computed by the control.

See also the functional description: "Operating mode: Electronic cam shaft with virtual master axis"

A132 Cam shaft, lagless, encoder 1, virt. master drive

The drive is **cam mode**. The function is derived from the mechanical cam principle. This includes a fixed position relationship between master and slave axes. The position command values are listed in the table and can be accessed using the master axis position. The drive follows the command value without lag. Encoder 1 means that the position encoder is mounted to the motor shaft (indirect measurement of axis position). Virtual master axis means that the master axis position is computed by the control.

See also the functional description: "Operating mode: Electronic cam shaft with virtual master axis"

A150 Drive controlled positioning, encoder 1

In the **S-0-0282, Positioning command** parameter, the drive receives a distance specification from the controller. When bit 0 of the **S-0-0346, Positioning command latch** parameter is toggled, this distance is summed up to the value in **S-0-0258, Target position**. In order to get from the current position to the new target position, the drive now generates (interpolates) an internal position command value curve. This is done taking the limit values of velocity, acceleration, and jerk in the parameters

- **S-0-0259, Positioning Velocity**
- **S-0-0260**, **Positioning Acceleration**
- **S-0-0193, Positioning Jerk**

into account.

The drive approaches the target position with a position lag that is proportional to the velocity. Encoder 1 means that the position encoder that is attached to the load is used for closing the position control loop (direct axis position measurement).

See also the functional description: "Operating Mode: Drive Controlled Positioning".

A151 Drive controlled positioning, encoder 1, lagless

In the **S-0-0282, Positioning command** parameter, the drive receives a distance specification from the controller. When bit 0 of the **S-0-0346, Positioning command latch** parameter is toggled, this distance is summed up to the value in **S-0-0258, Target position**. In order to get from the current position to the new target position, the drive now generates (interpolates) an internal position command value curve. This is done taking the limit values of velocity, acceleration, and jerk in the parameters

- **S-0-0259, Positioning Velocity**
- **S-0-0260**, **Positioning Acceleration**
- **S-0-0193, Positioning Jerk**

into account.

Encoder 1 means that the position encoder that is attached to the load is used for closing the position control loop (direct axis position measurement).

See also the functional description: "Operating Mode: Drive Controlled Positioning".

A206 Process block mode, encoder 1

The drive performs a closed loop position control with systematical lag. The actual value comes from the encoder 1 (motor encoder). The command value profile is generated in the drive. Target position, velocity, acceleration and jerk are determined by a pre-programmed process block. Depending on **P-0-4019, Process block mode**, the target position is interpreted as an absolute value or as a relative distance to move.

See also the functional description: "Positioning Block Mode"

A207 Process block mode lagless, encoder 1

The drive performs a closed loop position control without lag. The actual value comes from the encoder 1 (motor encoder). The command value profile is generated in the drive. Target position, velocity, acceleration and jerk are determined by a pre-programmed process block. Depending on **P-0-4019, Process block mode**, the target position is interpreted as an absolute value or as a relative distance to move.

See also the functional description: "Positioning Block Mode"

A208 JOG mode positive

The drive moves with a jogging velocity (P-0-4030) in the positive direction. The motor is turning clockwise, when viewing the motor shaft.

See also the functional description:"Operating Mode: Jogging"

A218 JOG mode negative

The drive moves with a jogging velocity (P-0-4030) in the negative direction. The motor is turning counter clockwise, when viewing the motor shaft.

see also the functional description: "Operating Mode: Jogging"

A400 Automatic drive check and adjustment

Diagnosis **A400** is a group diagnosis for various system states. It is used in drive checks and adjustments. A through diagnosis is automatically run when the drive enable is switched on and off. Drive checks and adjustments include systems states that are run through independent on parametrization.

- sequence of holding brake delay time (**P-0-0526, Brake control delay**)
- structure of air gap field (is asynchronous motor)
- automatic determination of commutation offset (if synchronous motor with incremental measuring system)

Depending on parametrization, the following system status is checked:

- Automatic brake monitor (**P-0-0538, Motor function parameter 1**)

A401 Drive deceleration to standstill

The drive

- is brought to standstill as defined in parameter **P-0-0119, Best possible deceleration** or
- carries out "velocity command value equals zero" after a travel range error has occurred.

see also functional description “General Instructions for Installation"

A800 Unknown operating mode

There is no diagnosis for the activated operation mode.

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7 Service & Support

7.1 Helpdesk

Unser Kundendienst-Helpdesk im Hauptwerk Lohr am Main steht Ihnen mit Rat und Tat zur Seite. Sie erreichen uns

Our service helpdesk at our headquarters in Lohr am Main, Germany can assist you in all kinds of inquiries. Contact us

- telefonisch - by phone: **49 (0) 9352 40 50 60**
  über Service Call Entry Center - via Service Call Entry Center
  Mo-Fr 07:00-18:00 Mo-Fr 7:00 am - 6:00 pm
- per Fax - by fax: **+49 (0) 9352 40 49 41**
- per e-Mail - by e-mail: **service@boschrexroth.de**

7.2 Service-Hotline

Außerhalb der Helpdesk-Zeiten ist der Service direkt ansprechbar unter

After helpdesk hours, contact our service department directly at

+49 (0) 171 333 88 26

oder - or **+49 (0) 172 660 04 06**

7.3 Internet

Unter **www.boschrexroth.de** finden Sie ergänzende Hinweise zu Service, Reparatur und Training sowie die **aktuellen** Adressen *) unserer auf den folgenden Seiten aufgeführten Vertriebs- und Servicebüros.

Verkaufsniederlassungen
Niederlassungen mit Kundendienst

Außerhalb Deutschlands nehmen Sie bitte zuerst Kontakt mit unserem für Sie nächstgelegenen Ansprechpartner auf.

*) Die Angaben in der vorliegenden Dokumentation können seit Drucklegung überholt sein.

At **www.boschrexroth.de** you may find additional notes about service, repairs and training in the Internet, as well as the **actual** addresses *) of our sales- and service facilities figuring on the following pages.

sales agencies
offices providing service

Please contact our sales / service office in your area first.

*) Data in the present documentation may have become obsolete since printing.

7.4 Vor der Kontaktaufnahme... - Before contacting us...

Wir können Ihnen schnell und effizient helfen wenn Sie folgende Informationen bereithalten:

1. detaillierte Beschreibung der Störung und der Umstände.
2. Angaben auf dem Typenschild der betreffenden Produkte, insbesondere Typenschlüssel und Seriennummern.
3. Tel.-/Faxnummern und e-Mail-Adresse, unter denen Sie für Rückfragen zu erreichen sind.

For quick and efficient help, please have the following information ready:

1. Detailed description of the failure and circumstances.
2. Information on the type plate of the affected products, especially type codes and serial numbers.
3. Your phone/fax numbers and e-mail address, so we can contact you in case of questions.

7.5 Kundenbetreuungsstellen - Sales & Service Facilities

Deutschland – Germany

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